Veterinary Medicine

VOL. XIX MARCH, 1924 No. 3

The Veterinary Situation

By Veranus A. Moore, Ithaca, N. Y.

Grant Allen states, in his life of Darwin, that great leaders possess a two-fold ancestry. They owe much, in one way, to their parents, their grandparents and more remote progenitors from whom they derive the personal qualities whose special interaction constitutes their greatness. They owe much, in another way, to their moral ancestors—the thinkers and workers—who have preceded them in their own or allied fields of thought and action and who have made possible in the course of time the achievements of the hour.

What is true of a distinguished leader holds in many ways for the development of a great industry, because its success depends on two or more factors. The first is found in the initiative and genius of its founder and the others consist of the agent or agencies that come to its relief when the enterprise has advanced as far as it is possible for it to go by itself. From that time on success depends on the united action of the initiating forces and those required to supplement them.

The extensive animal husbandry in this country was made possible because a few wise men learned the laws that govern the breeding of animals and put them into practical operation. The expanse of territory and the freedom of the soil from infecting organisms enabled animal husbandry to develop in the beginning with little or no assistance. The time came, however, when the ravages of disease—the pestilence that walketh by night—made it impossible for animal owners to continue their industry successfully without the aid of those who could elucidate the nature of the diseases that were tending to destroy, and who could formulate methods for their prevention, or the treatment of the sick. At first veterinarians were required for the sporadic diseases only, but as the industry developed, epizootics and more chronic infectious diseases were introduced. It is but necessary to recall the successful struggle against contagious pleuro-pneumonia among cattle in the '80's, and the control of the successive epizootics of foot-and-mouth disease in later years to illustrate the significance of the veterinary profession in making possible a prosperous live stock industry. Again, the federal, state and city veterinary inspectors who safeguard the public against diseased and unwholesome meat and milk are rendering daily service of incalculable value, not only to these industries, but to all consumers of animal products.

*Presented at New York State Breeders' meeting, Syracuse, N. Y., Jan. 7, 1924.

The Development of Veterinary Science

The development of scientific veterinary medicine in America began with the Land Grant colleges in 1868. At that time animal husbandry was growing rapidly and the losses from disease had become alarming. Live stock owners recognized the need of more knowledge of these maladies and a better veterinary service. So keenly was this need felt that it is stated, on good authority, that in 1868 Ezra Cornell specified that President White should procure in Europe a trained man to study animal diseases and to teach veterinary medicine in Cornell University, which was about to open. Whether advised or not, President White engaged Dr. James Law, who came to America and at the opening of the university established a department of veterinary medicine. With the continued growth of animal husbandry the demand for veterinarians increased and numerous private schools were organized to supply them. These institutions had neither endowment nor facilities for research and consequently could add little to the knowledge of animal diseases. Veterinary instruction was given in practically all of the state agricultural and land grant colleges and a few of them gave a degree. In 1884, the Federal Bureau of Animal Industry was organized for research and to protect our live stock against the diseases prevalent in foreign countries. The Federal meat inspection was established, thereby opening foreign markets to American pork. The lung plague that had cost Great Britain

and her colonies tens of millions of dollars, and which had gained entrance to this country, was eradicated. Thus the veterinary profession demonstrated its value and efficiency in combating the diseases from without that threatened our cattle industry.

Losses from Sporadic Diseases

As the dairy and meat industries advanced, it became clear that, while the epizootic diseases received most public attention, they are not the ones that cause the heaviest losses to animal owners. A recent study of the reports of available ambulatory clinics shows that the services of veterinarians are wanted much more for the sporadic diseases and injuries than they are for the epizootics and more chronic specific maladies. A few years since, I sent a questionnaire to a large number of our more successful practitioners to ascertain the relation between the sporadic and infectious diseases as determined by the nature of the services for which they were called. The replies showed that practice generally confirmed the conclusion reached from the reports of the clinics, namely, that the sporadic diseases caused a much larger number of deaths in animals than the so-called infectious maladies. A further study shows that the losses caused by death or impairment of animals are greater from any one of several of these diseases than they are from any of the chronic infectious maladies, prevalent in this latitude. In the conservation of animal life, therefore, it is necessary to understand the complexity of veterinary service. There must be official, sanitary and regulatory veterinary supervision to guard against the introduction of new diseases and the unnecessary spread of the more chronic infections already here. Also, there must be trained and competent practitioners of veterinary medicine, properly distributed through the animal raising districts, to aid the owners in the prevention of the usual maladies and to treat the animals that may become affected.

As early as 1910, there were according to the census, 11,551 veterinarians in the United States, fairly well distributed in the live stock districts. There were 199,000,000 animals (horses, cattle, sheep and swine), valued at $5,138,000,000. There was one veterinarian for 17,240 animals that had an estimated value of $456,000. This did not include poultry or pet animals.

Better Qualified Veterinarians Required

In 1914, the state veterinary colleges demanded graduation from high school as a preparation and four full academic years of technical training for the veterinary degree. The losses caused by disease called for more knowledge of their nature and a better understanding of them on the part of the practitioners. So important became better preparation of practitioners that by 1918 it was recognized that veterinary schools could not be equipped and maintained satisfactorily on the fees that the students could pay. This placed veterinary education very largely in the state schools. They were obliged to assume the responsibility for the solution of the educational problems, and the provide the facilities for training adequately men to render efficient veterinary service in all of its branches. Those who took the course had to qualify in all phases of the profession. They could not specialize to any marked degree for they must go largely to their patients, and, further, from the very nature of the case, they must be prepared to diagnose and treat all affected animals within their reach These men were giving years of valuable time and expending considerable money to prepare themselves for the service they expected to render the owners of animals. The breeders had come for the first time to have available men trained in the modern phases of veterinary science. The standards so long sought for by the leaders in veterinary education were established and attention was being called to the diminution in the losses from animal diseases.

Changes After the War

At the close of the world war economic changes occurred in agriculture that affected materially the veterinarian. The rapid fall in price of farm products reduced the value of animals and lessened the amount of veterinary service called for. The automobile had eliminated the driving horse from the cities, and altogether there was considerable unrest in the profession. The veterinarians did not suffer from the unfavorable economic situation more than others associated with rural life. A condition was encountered, however, which tended to discourage the practitioners.

The world war was made the occasion for starting numerous propaganda for the betterment of existing conditions. Among these, was an appropriation made by Congress for the control of bovine tuberculosis and the task was placed on the Bureau of Animal Industry. In the fall of 1917 the Bureau proposed the Accredited Herd Plan for the eradication of this disease from purebred herds only. It provided, in co-operation with the states, free

testing of herds by the Federal and state veterinarians and the payment of a Federal indemnity in addition to that provided by the state. Although the plan contained an element of state veterinary medicine, it commended itself on the ground that the owners of pure-bred animals would be heavy losers at best and if they could be induced to eradicate the disease from their herds, which were the source of better animals for the improvement of all dairies, it would be a strong stimulus to dairymen to have sound animals only. It was believed further that owners of these herds would employ their own veterinarians to be with the Federal or state men in making the tests. The plan was approved by the U. S. Live Stock Sanitary Association and the Secretary of Agriculture and put in operation as quickly as possible. It was hoped that purebred herds would be cleaned up by this method.

Effect of Federal Veterinary Work on Practitioners

The Federal Bureau extended the plan very shortly after its adoption to all cattle. This unexpected action introduced a serious factor in veterinary practice. It means the introduction of salaried state and Federal men to take over the testing, free of charge, that was being done by practitioners. In this state a large number of veterinarians were encouraging owners of cattle to eliminate tuberculosis. They were testing in the aggregate many animals annually. The veterinary college has furnished them with many thousand doses of tuberculin annually for many years. This work had come to constitute an appreciable part of the service rendered. Although the Accredited Herd Plan provides, that after herds are accredited they shall be turned back to the local practitioner for subsequent testing, it meant that for a period of from one to several years the practitioners must surrender this part of their work and the income from it. In some instances it meant a reduction of from 5 to 40 per cent of the business. Naturally these men were discouraged; many could not live on the work that was left for them to do and, consequently, they were obliged either to move to other localities to practice or take up other occupations. Further they did not encourage boys to enter veterinary colleges.

Shortage of Veterinary Students

The effect of the combined circumstances on veterinarians is reflected best in the decrease of students. In 1910 there were 2787 veterinary students matriculated in the United States. In 1919 there were 722. This marked reduction was not considered especially significant at the time because of the changed economic conditions. However, in 1920, '21 and '22, there were further reductions; and this last fall, 1923, there were but 502 students enrolled in all the state veterinary colleges in the country. This means that for the next four years, at least, there cannot be graduated more than 125 veterinarians annually, or less than three for each state. On the other hand, from 300 to 400 veterinarians are retiring for natural causes each year. And further, new positions are being created. Cities are employing larger numbers of veterinarians for dairy and meat inspection; the poultry industry is attracting a few; and a considerable number are devoting their entire time to small animal practice. In England it is reported that already dogs have come to require as much attention from practitioners in the cities as the horse did prior to the age of automobiles. As the range of work for veterinarians is extending, the number available for country practice is being reduced steadily.

It has been said that because the horse has gone, veterinarians are not required as much as they were formerly. The answer is contained in the following facts: The Yearbook of the Department of Agriculture for 1922 shows that there are over 18,000,000 horses in the country now, which is only 3,000,000 less than there were at the maximum production prior to the war. Further the census of 1920 shows that there were 215,000,000 animals in the United States, which is 16,000,000 more than in 1910. There were approximately 8,600 graduate veterinarians, or one for 24,800 animals instead of one for 17,000, as in 1910. In New York State there is an investment of over $300,000,000 in live stock exclusive of poultry and pet animals. The losses from disease are estimated conservatively at from 3 to 5 per cent. It is believed that efficient veterinary service can save fully half of this loss. There is actually more work for veterinarians now than at any previous time, but, unfortunately, much of it is not being done.

No one interested in the live stock industry, who appreciates what the veterinary profession means for its success can view the present situation without some apprehension. Live stock owners cannot afford to be without competent practitioners, or to have men of inferior preparation to advise them relative to the diseases of their animals or to treat their stock. This

emphasizes the significance of the present situation, not only in connection with the live stock industry, but the health of the consumers of animal products as well. Already the number of requests for veterinarians is in excess of the men to meet the demand. While the situation is not encouraging anywhere in the United States, in New York it is becoming serious.

Private Practitioners Are Needed

The solution of the problem rests largely with the men who own the animals, and the live stock sanitary authorities in the state. The discouragement experienced by some veterinarians has come from their good clients being compelled to accept from others free of charge certain veterinary work which they had been doing previously and, so far as they could ascertain, in a perfectly satisfactory manner. The outcome has been to deprive certain communities of general veterinary service which is needed now as much as ever before. I do not think this effect was anticipated by the authorities in the beginning. The Department of Farms and Markets recognizes that animal owners should have competent practitioners available, and it is undertaking to overcome the difficulties by employing local veterinarians as much as possible for sanitary work. Undoubtedly this will help to keep many men from leaving the profession, and encourage young men to attend veterinary colleges. Already in a number of localities the free tuberculin testing has deprived owners of competent veterinary service which has cost them heavily in times of emergency.

Would it not be better economically for the live stock owners and sanitary officials to agree on some procedure that will bring the local veterinarians in co-operation with the state in the professional work in their localities, for which they have been properly trained, largely at state expense? This would not interfere with the assistance that is being given by the Federal and state governments to the work in which they are interested and for which they are contributing so generously by way of indemnities at the present time. It would mean Federal and state supervision of sanitary and control work.

Is it not worth while for every owner of valuable animals to have a competent veterinarian within reach for the treatment of acute troubles and other emergencies? Is not the loss of a valuable cow and her calf in dystocia more than should be exchanged for a free tuberculin test? It is well to consider that the operation of the Accredited Herd Plan does not afford any assistance after the herd is accredited, which is the time the owner will profit by it. From then the owner must assume all responsibility for keeping his herd clean. Will he not want within easy reach veterinarians to advise him on a multitude of questions that will arise and that must be answered accurately and promptly if success prevails? Further they will be needed to do subsequent testing. The initial test and slaughter of reacting cattle is but the first step in obtaining and maintaining sound herds, and it is the only part of the plan in which the Federal and state governments give assistance. To make the effort worth while, the herds must be retested and maintained free of disease. The high purpose of tuberculosis eradication is to enable the breeder to reap the reward in operating sound herds and in creating a better market for their cattle and their products. Twelve of our states are supporting veterinary colleges for the purpose of providing properly trained men for assisting breeders in all matters pertaining to animal diseases. They are the only colleges that have curricula containing the necessary combination of sciences to prepare men for this important work. There is no substitute for the veterinarian.

Situation Can Be Remedied

I have made bold to bring this matter to your attention because of its vital significance to the live stock industry of this and other states. Experienced and competent veterinarians are not made in a hurry. The menace of state medicine has had the effect of reducing the number of students to a minimum, and of influencing many well trained practitioners to give up their profession and go into other business. It is unfortunate, of course, for them to find it necessary to leave the profession of their choice, but they are well trained men and they are succeeding in other work, but the communities they served professionally are waiting anxiously for veterinarians to take the place of those who have left. But where are they coming from? The situation as set forth is incident to the readjustment after the war. If it is recognized it can be remedied. If it is ignored it will be but a few years before quacks and charlatans will be in command. I have faith to believe that the live stock owners will not permit such a catastrophe to overtake their industry.

Developments in Veterinary Parasitology, During the Past Fifteen Years

By Maurice C. Hall, Associate Editor

(Continued from February issue)

NEMATODES

The large number of nematodes and their increasing importance has led to extraordinary interest in their life histories during the past 15 years, and it is only possible to sketch briefly the outstanding developments of that period in this field.

Monoxenous (Single-host) Nematodes

The outstanding developments in life history studies of nematodes without intermediate hosts have been the discoveries of the migrations through host tissue of larvae of worms which were previously supposed to develop to maturity without migration at the site where the adults were usually found

Ascarids

Up to 1916 it had been generally accepted that ascarid larvae taken into the digestive tract by a suitable host developed to maturity in the digestive tract without wandering through the body as hookworms were known to do. In 1916, Stewart published a paper reporting that when the eggs of Ascaris lumbricoides were fed to mice the larvae migrated to the liver and lungs, ascended the trachea, were swallowed and passed out in the feces. In spite of the fact that Stewart drew some erroneous conclusions as to the relation of mice to man in ascarid infection, this work was highly significant and promptly led to further investigations along this line, notably by Ransom, Ransom and Foster, Ransom and Cram, Yoshida and Fuelleborn. The conclusion arrived at by Ransom and his collaborators and by Fuelleborn was to the effect that larval ascarids habitually entered the wall of the digestive canal, were carried in the portal circulation to the liver, left the capillaries of the portal system for those of the hepatic vein, traveled in this vein to the right side of the heart, thence to the lungs, left the blood for the air spaces of the lungs, ascended the trachea to the mouth, were again swallowed, and on arrival in the intestines developed to maturity. Some larvae enter the lymphatics and some enter the systemic circulation by way of the pulmonary veins. Yoshida concluded that the larvae penetrated the intestinal wall, entered the body cavity, and then penetrated the liver, but his conclusions have not been sustained by other workers and it appears likely that larvae found in the body cavity have left the usual track of migration and gone astray.

One immediate result of Ransom's investigations was his discovery that the lung lesions observed in laboratory experiment animals were duplicated in swine in nature and that pulmonary ascariasis in young pigs was one cause of thumps. This finding was abundantly confirmed by the field observations of Raffensperger in Illinois. It now appears likely that ascarids in man, especially in children, may be the cause of obscure pulmonary disturbances. Koino has published a very striking account of the serious pulmonary symptoms produced in himself after swallowing hundreds of ascarid eggs.

Of great practical importance is the development of the swine sanitary system devised in the federal Bureau of Animal Industry and commonly called the McLean County System from the county in Illinois where it has received its first and most extensive field test. This system, based on sanitary measures to protect young pigs from ascarids during the first four months of life, when they are most susceptible to infection, has proven exceedingly effective in preventing losses among young pigs. As was to be expected from a general sanitary system, it protects against various infectious diseases, aside from those due to worms, and is a striking illustration of the value of giving young animals special care and attention to diminish the excessive infant mortality which is prevalent among domesticated animals as among human beings when they are not given such preferred attention during their young life.

Fuelleborn has done the most striking work on the life histories of the dog ascarids and has shown that Belascaris marginata larvae have a tendency to form worm knots or nodules in the liver, kidneys, muscles, etc., whereas Toxascaris limbata larvae are less disposed to encyst in the host tissues. He also produced prenatal infestation in pups by injecting un-

der the skin of a pregnant bitch thousands of Belascaris larvae obtained from the liver of an experimentally infested guinea pig. Shillinger and Cram have extended this investigation by producing prenatal infestation in pups by feeding embryonated eggs of B. marginata to a pregnant bitch. These observations shed considerable light on the incidence of ascarids in pups and point to the necessity for prophylactic measures, in the handling of breeding bitches to prevent worm infestation in pups.

In this connection it may be mentioned that the possibility of intrauterine infestation with parasitic worms is evidently great in many cases. Such infestation has now been shown for Schistosoma japonicum, Fasciola hepatica, human hookworms, Ancylostomum caninum, Necator suillus, Dictyocaulus filaria and the cattle ascarid, in addition to B. marginata noted above.

Pinworms

The life histories of pinworms require further investigation to clear up a number of things. In the case of the human pinworm there is a conflict of evidence as to the circumstances under which the eggs hatch and as to whether eggs may hatch without leaving the body of the host and develop to mature worms under such conditions in this same host individual.

In the case of the horse pinworm, Oxyuris equi, certain larval stages were described by Railliet and Henry in 1903. Their findings have since been extended by Ihle and van Oordt. Subsequently Schwartz has made some interesting observations on the eggs, noting that the long-tailed worms (O. mastigodes) commonly oviposit in vitro, whereas short-tailed worms (O. curvula) rarely oviposit in vitro. Uterine eggs obtained by cutting up female worms do not develop in vitro, whereas those eggs normally discharged from the female do develop in vitro. Exposure to air appears to be essential to the development of the eggs, and water appears to be destructive to the newly hatched larvae, from which Schwartz concludes that eggs must leave the body of a host before they can develop, an initial infestation not increasing by new generations developing entirely within the host. Infection appears to be simple and direct, the eggs hatching in the intestine and larvae developing to adults without migration through the host tissues.

Heterakids

The investigations of Graybill and of Uribe indicate that the cecum worm of chickens has a simple life history. When eggs are swallowed they hatch and the larvae appear to enter the cecal glands, subsequently returning to the lumen of the ceca.

The life history of the large roundworm of poultry, Ascaridia galli, appears to be a matter of dispute at present. Ackert reported finding a larva in the lung and one in the trachea, and a study at the Oklahoma Experiment Station, apparently by Guberlet, reports the migration of the larvae to the lungs and back to the intestine. Other workers have found a direct life history without a tissue migratory phase, leaving the matter at present in a state of uncertainty.

Whipworms and Related Forms

So far as can be judged at present, whipworms do not have a tissue-migratory stage, although one of the Japanese workers, Neshi, has reported larval whipworms, Trichuria depressiusculus, from the lungs. Fuelleborn has reported feeding experiments on guinea pigs and rabbits with eggs of the human whipworm and finds development beginning in the cecum.

On the other hand, many relatives of the whipworms migrate as larvae through the host tissues. Yokogawa has shown this for Trichosomoides crassicauda of rodents; Isobe has shown it for Hepaticola hepatica, it is notoriously true for Trichinella spiralis, and it must be true of such forms as Capillaria plica of the urinary bladder of carnivores and Capillaria aerophila of the lungs of carnivores.

Lungworms (Metastrongylidae)

The life history of a lungworm was first ascertained for Dictyocaulus filaria of sheep by Neveu-Lemaire, his work being subsequently confirmed by Romanovitch and Slavine, Guberlet, and Daubney. The eggs hatch in the lungs and the larvae ascend the trachea and pass out for the most part in the manure. They then tend to develop to the infective stage, are swallowed in contaminated food or water, penetrate the walls of the digestive tract, and make their way to the lungs, apparently by the blood stream. Von Linden has claimed that there is an intermediate free-living generation, but her work is in conflict with the findings reported above and suggests that the possibility of free-living nematodes in her culture material was not adequately excluded. Van Saceghem claims to have found in the case of the cattle lungworm, Dictyocaulus viviparus, a life history similar to that described by Linden,

but the weight of evidence seems to be against him at present.

The life histories of the swine lungworms, Metastrongylus elongatus and M. brevivaginatus, have been ascertained by an American worker, Zebrowski. In general it is similar to that of D. filaria above, but the moisture requirements of the larvae in cultures are rather exact. Zebrowski's work, published in 1921 in the proceedings of the Indiana Academy of Science, has been quite generally overlooked.

Trichostrongyles

As early as 1889 Railliet had established by feeding experiments the life history of Graphidium strigosum and Trichostrongylus retortaeformis of rabbits, showing direct development. Ransom (1907) confirmed his findings for Tr. retortaeformis. The work of Ransom on the life history of the sheep stomach worm, Haemonchus contortus, was the forerunner of a number of investigations on life histories of the trichostrongyles. Ransom followed the molts of the larvae from the egg and showed that the infective, ensheathed larvae ascended blades of grass under favorable conditions of moisture and temperature, thereby ensuring the survival of a large proportion of larvae since these were ingested by sheep and other ruminants in cropping the grass. His study has been extended in detail in an excellent work by Veglia in South Africa. A similar detailed study of the life history of Nematodirus filicollis has been published by Boulenger. Similar detailed knowledge is still lacking for most of the trichostrongyles of domesticated animals.

Strongyles (Strongylidae)

A very important discovery in regard to the life histories of strongyles was made near the end of the last century by Looss, who found that hookworm larvae could enter the intact skin and produce infection, the larval worms migrating through the body by way of the blood stream until they reached the lungs, then ascended the trachea to the mouth, and developing to adults in the intestine on being swallowed. The occurrence of cutaneous infection, or of larval migration through the host, or both, has since been found to occur in the cases of many worms. A development of great interest in connection with hookworm life histories is found in the recent work of Cort and his collaborators, who have shown that hookworm larvae in nature only live a matter of weeks instead of a year or so as in laboratory cultures, and that the larvae in the soil commonly lose their sheaths.

In the case of the horse strongyles (Strongylus spp.), it was long known that migration of larvae through the host tissue occurred, as larval and agamic worms were found in horses in a wide range of tissues and organs. There is yet much to be ascertained in this connection, although some points have been ascertained. Railliet has recently published a description of the life history of the free-living larval stages of Strongylus equinus, and the sites of tissue infestation with the agamic worms are known to some extent, but the details of the wanderings in the body are yet unknown. Glage, Martin, Railliet and Henry have similarly sketched the life history of S. edentatus, with substantially the same gaps in the story, and Adelmann, Colin, Sticker, and Railliet have similarly sketched the life history of S. vulgaris.

The life histories of the cylicostomes remain uninvestigated for the most part. However, Railliet has identified the nematode, Trichonema arcuata, found encysted in the mucosa of the large intestine of the horse by Cobbold, with the adult Strongylus tetracanthus Mehlis, and in turn has identified Strongylus tetracanthus Mehlis, with Cylicostomum insigne Boulenger, a form distinctly different from that regarded by Looss as S. tetracanthus.

Some interesting work has been done with the larvae of hookworms and nodular worms in ruminants, but the details as to the mode of infection and the subsequent movements and development of the larvae have been published in a well rounded out form only in the case of the nodular worm of cattle, Proteracrum radiatum, which was studied by Manotel (1908). Little has been added of late years to the early work of Curtice (1890) on nodular worms in sheep.

The Swine Kidney Worm (Stephanurus Dentatus)

Bernard and Bauche report that the infection with this worm may follow the penetration of the skin by infective larvae or the swallowing of such larvae. However, they find that larvae entering by the skin reach the usual site of infestation in the kidney region, whereas those entering by the mouth get to the liver and cannot carry on the normal life cycle.

The Poultry Gapeworm (Syngamus Trachealis)

Ransom has shown that the normal host of this worm is the turkey and that turkeys of all

ages may harbor the parasite, whereas chickens are only susceptible to infection as a rule when they are young chicks. This finding leads to the very important conclusion that prophlylaxis is primarily a matter of keeping chicks away from turkeys and from areas used by turkeys.

The Equine Strongyloides (Strongyloides Westeri)

The life history of this worm has been ascertained by de Blieck and Baudet. In general it resembles that of other species of the genus. The rhabditiform larvae transform to infective filariform larvae or to free-living males and females which in turn give rise to rhabditiform larvae transforming to infective filariform larvae. The infective larvae may enter hair follicles or clefts in the skin or may produce infections when swallowed. In either case they make their way to the lungs and thence to the mouth by way of the trachea, are swallowed and subsequently develop to adults in the intestine.

(To Be Continued)

A New Lung Disease in Foxes

By George A. Jeffreys, Research Bureau, Fox and Fur Farmers' Supply Co., Detroit, Mich.

Silver foxes have only recently begun to be domesticated. It will be many years before they become thoroughly domesticated in the true sense of the word. At some future date, the ranches of today will be classed as pioneer ranches in the domestication of the silver fox.

Because raising silver foxes is only of recent origin, veterinary science has not as yet had the opportunity of working out and classifying some of the diseases of foxes. Dr. Allen of the Canadian Fox Research Station has contributed much to our present knowledge along this line. We have also gained much information in regard to anthelmintics from Dr. Maurice C. Hall of the U. S. Bureau of Animal Industry. Dr. W. L. Chandler of Michigan has been doing research work on parasites of foxes for the past few years. His recent article in VETERINARY MEDICINE points a way toward a possible elimination of parasites from the ranch. As time goes on our store of knowledge of fox diseases will gradually increase.

New Disease Differs from Distemper

During the past two years, a number of cases of deaths were brought to the writer's attention, in which the cause could not be classified. The disease although having symptoms somewhat similar to those of distemper and lungworms, proved to be fundamentally different. During the past year some close observations of the symptoms, postmortem findings and microscopic examinations, were made possible.

The disease has probably escaped notice because of its similarity to distemper, pneumonia and lungworms. The symptoms common to these diseases are a rise in temperature, increased respiration and labor in breathing, coughing, etc.

The course of the new sickness lasts from two to four weeks. This is usually the first stage. Fifty per cent of the foxes die in this stage. Although foxes may recover from the first stage of the disease, the lungs have been so greatly damaged that usually a secondary infection takes place with other organisms, and the animal dies a slow, lingering death. The mortality of the disease is high like distemper and pneumonia, but its progress and development are more gradual, the secondary infection sometimes extending over several months. In contrast to distemper, which spreads like wildfire, the disease is slow in spreading, but once the animal gets it, it seems to be doomed.

One of the outstanding symptoms is a great emaciation, although the appetite usually remains good to the end. The fox becomes gradually very thin with a tendency toward having a pot belly. After a time, from two to three weeks, the respiration increases noticeably and the breathing becomes labored with an occasional hacking cough. Finally, the animal has great difficulty in getting enough air and holds its nose up as if reaching for more. The eyes in the last stages commence to water and run.

A fox with distemper has little or no appetite. It takes on a dull, listless attitude, also the crisis is reached in a few days.

Postmortem and Laboratory Findings

A postmortem examination of foxes that died of this disease showed that it is gradual in its development. At first only a small portion of

the lungs become infected. This infection gradually extends to every part of the lungs. The affected portion is dark red in color and highly congested with blood. The line of demarcation between unaffected and infected portions is very distinct, the healthy portion being light pink and firm. Sometimes the fox dies after one-half of the lungs become infected. One female died only after every part of her lungs became congested.

While the long duration of the disease indicates that it is not pneumonia, the microscope also proves conclusively that it is not. An incision across the infected portion of the lungs produces an oozing of bloody, watery secretion. A microscopic examination of this secretion shows millions of one kind of microorganisms. In shape and staining qualities, they are similar to the influenza bacillus. One distinct feature, however, is that they grow alone and alone produce the disease. The influenza bacillus very rarely does that. There are always several other kinds of germs mixed in, and the whole together produce the disease. The same is probably also true of distemper.

Technically speaking, the new bacilli are Gram-negative, occurring two and three in a chain and singly. They are non-motile and a little larger and more plump than the influenza organism. The microscope reveals them to be very numerous among the blood cells, so that it is possible to get a pure culture from a direct smear.

The bacilli grow well upon ordinary media for the first twenty-four hours, but soon lose their tenacity of life and growth. They are readily killed by ordinary disinfectants and soon die when out of their environment. Perhaps it is for this reason that the disease is not highly contagious but is slow in spreading.

To determine if the disease was merely localized or whether there was also a septicemia, a blood culture was taken from a different part of the body. In all cases the blood findings were negative.

A Bacterin Suggested

The fact that the disease is caused by one strain of bacilli and that it is localized will probably make it possible to obtain a bacterin so that all foxes on a ranch can be easily made immune.

With this object in view, an attempt was made this summer to immunize a ranch against this disease. On this ranch five foxes had already died in the first stages, while four had it in the secondary stage. A pure culture of the organism was grown and a bacterin prepared. All foxes on the ranch were vaccinated two times, each vaccination being several days apart. The second dose was twice as large as the first.

An improvement was noted in all foxes affected in the course of a few days, and further deaths from this disease were stopped entirely. Foxes, with the disease in the secondary stage, however, did not respond to the vaccination. But this is what can naturally be expected as the lungs had become so seriously damaged that they made a good breeding ground for other pathogenic bacteria.

Dr. F. N. Steele of Muskegon, Mich., working along similar lines, mentions in a letter to fox raisers that there is a disease in foxes similar to influenza with a high mortality. He further states that by preparing a bacterin from diseased animals, he has been able to reduce the mortality to as low as one per cent.

The writer has set forth the foregoing observations in the hope that it may throw some light on the subject and possibly bring it to the attention of a group of men who would be able to work the problem out thoroughly. There is still much to be done and many tests made before any standard vaccine or bacterin can be placed on the market. All indications seem to point out that this is one disease where a bacterin would be highly practical.

The Indian Dog-Doctor

By George Cecil, Paris, France

Dog Meets Cat

"Sahib, I was making dog all right. I being very good dog doctor. I first-class dog doc——"

The speaker was a respectable-looking native of Lucknow, with the face of a Brahmin priest, and the figure of an over-trained racer, and his eloquence was nipped in the bud by the attentions of Lloyd George, my treacherous hound, who loudly yelped the moment he set eyes on the dog-doctor. Peace being restored, I explained that the pugnacious animal had just been wounded in an encounter with Omar, a topaz-eyed Persian cat, an animal of aristocratic descent, for whom he had conceived an antipathy such as the lower orders frequently have for their superiors by birth and education, and that I wished to have the affected part antiseptically treated. That was the beginning of my acquaintance with Mahomet Din, who, besides being named after the Prophet, spoke English more fluently than correctly.

He also possessed other virtues, of which more anon.

Mahomet the Invaluable

During a stay of some months in Lucknow I had many opportunities of availing myself of Mahomet's services, which, on the whole, were invaluable. For if he did not always effect a complete cure, he often succeeded in alleviating suffering, while the dog-dealing activities which formed a side-line of his business frequently resulted in his bringing me a promising pup, which changed hands at a reasonable figure. And his entertaining prattle about the members of the white community, whose dogs he attended, not infrequently helped to while away the leaden hours of the "long, long Indian day." Indeed, I eventually found his conversation so diverting that I paid him a rupee a week to make a short morning call.

If my kennel needed medical attention, he devoted himself to his professional duties, but if Tipoo, Dreadnought, Alonzo, Rum Punch, Nanki Poo, and the before-mentioned Omar of the topaz orbs, were not in want of his ministrations, squatting on the boarded verandah, he would give me the khubber (news) of the "station." Thus:

"Sahibs in cavalry regiment getting pack of foxhounds from England . . . . for hunting jackal; very rich Sahibs . . . . all say India dam hot . . . . Colonel Sahib getting pup of Fox Terrier from Cantonment Magistrate. Colonel Sahib's wife also getting pup, this time it a boy . . . . American-dentist's bull-dog him eat Commissioner's Sahib's shoes: Commissioner Sahib make angry words. Dentist Sahib only laugh: Commissioner Sahib say him having cheek . . . . Assistant Magistrate not take bath, so Cavalry Officers not make him member of mess: he not like dog, only buy books: him no good for business. . . . Adjutant of native infantry buying prize dog for Captain Sahib's wife: Captain Sahib angry . . . . Adjutant Sahib saying Captain Sahib go to devil and dog too . . . . White soldier much liking dog: that very good. I selling plenty to white soldier, and I making well all ill dog for all station. When Roberts Behadur Commander-in-Chief in India I his dog-doctor, I cure every-thing . . . . Old Mahomet Din only good dog-doctor in country: Simla, Calcutta, Bombay, no good . . . . Artillery Major buying Rampur hound from Chaplain; him giving twenty rupee. Him fool, I selling Rampur hound for fifteen rupee . . . ." A mine of information.

An Incompetent Substitute

Mahomet, being a fairly prosperous person, invariably attired his lean carcase in respectable clothes, consisting of a white linen garment of frock-coat cut with abnormally long skirts, and pajama-like pantaloons of the same material. His head was surmounted by a vast blue turban, and, following the custom of the country, he invariably went bare-footed. Less well-to-do dog-doctors, however, sport unwashed rags, and their alleged knowledge of canine ailments is on a par with their wardrobe.

Twice during Mahomet's absence upon an affair which was probably not unconnected with dog-stealing, I had occasion to call in another practitioner, who swore by all the gods in India that he was acting as *locum tenens* for my regular attendant. The villain, who, it subsequently transpired, was no dog-doctor, naturally enough, knew nothing about the evils to which dog's flesh is heir; and the alleged *kutta-ka-hakim*, who was invited to prescribe for a severe attack of distemper, proved utterly inept. He, by the way, turned out to be

a "sweeper," a lowly individual whose duty it is to keep Fido's coat free from fleas—if he can.

Upon Mahomet's return, I enlightened him as to the scurvy trick which had been played upon me. The next morning Mahomet was hauled before the beak, and bound over by the Cadi to keep the peace.

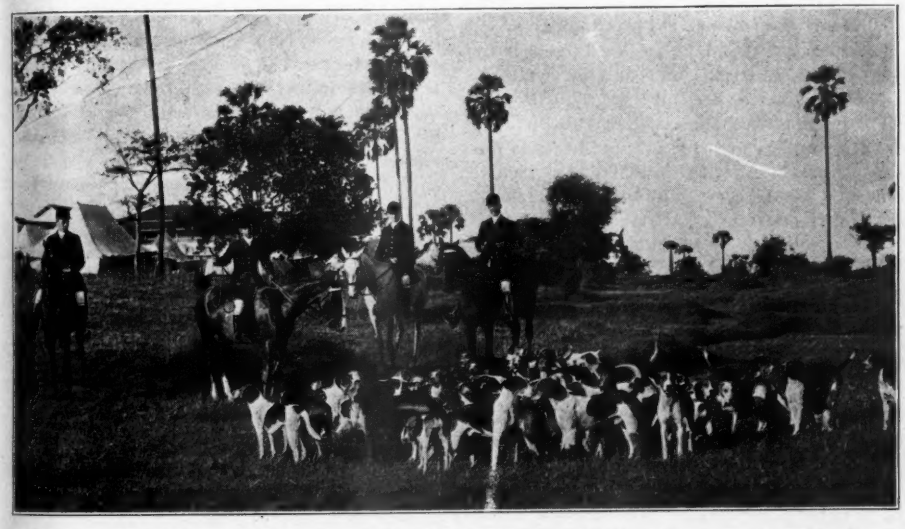
His Stock in Trade

The dog-doctor's stock-in-trade consists of chits (testimonials), which are passed on from father to son, or bought for a few pence from a bazaar dealer in these highly prized credentials, and a rough and ready knowledge of dogs and their diseases. It must, however, be confessed that few of the fraternity are a quarter as well informed as they profess to be; even the exemplary Mahomet was known to mistake a compound fracture for a simple strain, and the sting of a scorpion for a harmless mosquito bite. At the same time, he had his good points, for he invariably was cheerful and obliging, and, unlike 99½ per cent of his fellow countrymen, he usually was punctual. He excelled in the delicate operation of removing the unnecessary inches from the tail of a fox terrier pup—an operation which is delicate, in that a fractional part of an inch the wrong way may mar the animal's appearance for life.

Major operations are quite beyond the scope of even the most pretentious native vet; but where pills, cold water compresses, and poultices of herbs are sufficient to meet the cure the coloured man usually can be depended upon to effect a cure—of sorts. Indispensable is he.

Distance No Object

Frequently the "darg-darkter," as English-speaking servants term him, in addition to having the medical care of half the tykes in the "station," goes long distances by rail and road to attend to a Rajah's kennel, or an indigo planter's pack. If unhampered by considerations of time, as soon as he leaves the line of rail behind him, he sets out to complete the distance, even if it be fifty miles, on foot, carrying his impedimenta in a bundle which is slung over his shoulder. Sometimes he returns to the bosom of his family with a pocket full of money; but, owing to the lack of coin in planting circles, and to the innate dishonesty of the wealthy blacks, he has been known to arrive home poorer than he was before he started on the quest of the elusive "dib." Sad may be his lot.



A "cold weather" meet of hounds (the jackal h nted). Mahomet is in veterinary charge of the pack.

Among a varied list of patrons may be mentioned the military and civil officers, the barristers and the mercantile community, the nondescripts who make up the white population of a large "station," and the soldiers. The last-named cannot afford a substantial fee; yet so dear to the warrior is the health of his tyke that he has become a teetotaler in order that the money thus saved may be expended or

medical attendance. The dog-doctor, fortunately, is not proud; if he cannot obtain a *rupee* for extracting a thorn by means of poulticing, he is satisfied with four *annas*. And the soldier, who is not inclined to pay the equivalent of half-a-crown for having Fido cured of fever (a common complaint in India), generally manages to bring the fee down to a quarter of that sum. In fact, the far-seeing Mahomet informed me that during one lucky month he visited one hundred and fifty-six soldiers' dogs at six *annas* a visit, thus swelling his taking to a considerable sum for a master of a humble calling.

Mahomet added that he prayed for the soldiers night and morning.

"Neem" Leaves—and Incantations

The average practitioner jealously guards the secret of his nostrums and boluses, while he also endeavors to keep the ingredients with which he poultices sprains, and the ointment which he applies to sores and various skin diseases to which suffering Anglo-Indian dogdom is heir, a dead secret. But Mahomet, frank creature, treated me as a friend, and fully explained the means by which he effected cures. "Leaf of neem tree," quoth he, "being very good for poultice. Dog falling having big leg. I put on *neem* poultice. Dog getting all right. If dog having fever I giving sweet spirit nitre make stop fever . . . Sometimes him having much flea: then I make plenty bath and carbolic soap and make some disinfect in Master's house . . . . If dog getting thorn in foot I make big bread poultice and pull out dam thorn. If this no good I saying to Sahib, 'Master taking dog to hospital' and doctor making some operation—then him coming out of foot quick."

In certain parts of India the natives attach great faith to incantations and spells, and the coloured vet who is called in to attend to a wealthy black man's dog delivers himself of many strange words which cannot be found in the pharmacopeia. He likewise makes mesmeric poses over the invalid's semi-moribund body, rolls his eyes, beats his breast, and generally conducts himself like a maniac who has assuaged his thirst with a certain spirit which is distilled from rice. These mumbo-jumbo proceedings, however, make no impression on the white conqueror, who is not always so easily taken in as the native imagines.

The Life Economical

"Why," I asked the good Mahomet, "do you live so cheaply?"

The question was not an impertinent one. Since the day I rescued my friend from the clutches of an infuriated and drunken loafer, who, having failed to swindle the grey-haired specialist, was belabouring him with a big stick, the dog-doctor resented no question which might be put for the purpose of satisfying a healthy thirst for knowledge. He therefore replied:

"*Sahib*, I not wanting good things. When I old man the money I save I give to Bank *Sahib*. I saying, 'I old man not living long time. Bank giving me so much rupees every month, and when I dying, Bank having rest of money.'"

Further information elicited the fact that for the sum of four rupees a week he could feed, clothe, board and amuse himself in the manner in which he and his kind have always been accustomed, and that even if he were to win the first prize in the Calcutta Derby Sweepstake, he would still be content with a few handfuls of rice and a spoonful of vegetable curry for his one and only daily meal. He was to be envied.

Alas! Poor Mahomet

When I bade my dog's medical attendant goodbye, he promised to write to me, through an amanuensis, every month, and for two years we maintained an active correspondence. Then a month passed without the usual Indian letter arriving—and intuition, knocking at the door of my heart, told me that all was not well with Mahomet. A week later there came a black-edged letter addressed in the hand-writing of the *baboo* (native letter writer) employed by the dog-doctor. It ran as follows:

"Honourable Sir,—My late principal Mahomet Din dog physician of this city being no longer alive and therefore not in a position to attend to business I write to say that the fellow is dead of the diabolical plagues Sir taken suddenly ill by dread disease he answered the roll-call instanter;—I am your faithful and obedient Mari Lal Ghose. Letter-writer to the late one."

The *chitti wallah* has a strange love for long words—and a strong contempt for punctuation marks.

The relation of surface area to the weight of an animal is a factor that should be given consideration. The smaller an animal the greater is the surface area in proportion to weight. The amount of heat radiated depends upon the surface area and therefore more food is required proportionally for small than for large animals.

The Treatment of Thrush

By H. J. Magens, V. M. C., V. S., formerly Assistant at Veterinary Clinics and Institute, University of Graz, Austria

Attention has to be called to the fact that the conditions described in American literature under the term "thrush" are identical with those named "canker of the hoof" in some works of British literature. Although gas treatments were not tried at the veterinary clinics at Graz, other ways of treatment were under test; especially the serological and biological methods were given a thorough trial. Although in some cases fine results were obtained, in most instances this form of treatment lacked dependability and stability. Almost every time it proved necessary to work with autogenous vaccines and virus to get anywhere at all. Questionable were also the results obtained by use of the nonspecific immuno-therapy. Still, many valuable data were collected in this way while other good methods were perfected elsewhere.

TREATMENT WITH SULPHUR-DIOXID

The use of sulphuric gases for therapeutic purposes, although at first as a disinfectant only, reaches way back into the most ancient times. The Greeks as well as the Romans thought the sulphur vapors to be very valuable, and the smoking of houses with sulphur and other agents was used during olden times for prevention as well as for the combatting of epidemics. But only a few years ago investigators finally succeeded in improving the methods of gas treatment, especially the use of sulphur dioxid so that the treatment showed marked success and became of general importance. According to Harms, Bruce and Hodgson (1916) the gas was used for parasitic eczema of man; according to Noller (1919) and Lepinay (1916-1917), for treatment of mange of dogs; and Vijel and Chollet, for the treatment of equine mange in 1917. During the same period but independently from these authors, Noller was working out a method of sulphur dioxid treatment of mange in conjunction with the gas division of the Army Veterinary Academy, which at present is so far superior to all other forms of treatment that it has proved to be a turning point in the history of gas treatments.

Klein wrote in 1921 about two cases where he observed, after a double gassing of a badly healing wound and a triple gassing of a beginning thrush, a reorganization of the cankerous growth and the drying up of the surface. A therapeutic agent of usefulness in the treatment of thrush has to have strong corroding power with sufficient effect in the deeper layers as well as drying and deodorizing qualities. All these are possessed by sulphur dioxid to a very high degree. Even if the reliability of sulphur dioxid as a disinfectant is somewhat doubtful and oftentimes conditional only, still its strong germicidal power when doses of larger concentration are used cannot be doubted.

Method of Treatment

Judging from the experiences given in the literature, we came to the conclusion that the density of the gas as employed for the treatment of mange would not be sufficient for a radical treatment of thrush. On the other hand, it was sure that the whole surface of the animal's skin could not be exposed on account of the dangers wrought by a higher degree of concentration; in other words, gassing within the cell, also on account of the waste of gas. The acid burns which have been observed at times with the gas treatment for mange, which there are merely accidental, here have to be produced to work upon the diseased foot systematically and locally. These considerations, that is, to produce these acid burns without danger of life to the patient, led to the construction of an apparatus which enabled the local gassing of a foot and the leg as well.

In order to avoid injuries to the animal, it is recommended to block the volar and the plantar nerves with novocain injections. Only very unmanageable animals have to be thrown. It is a good idea to feed while the apparatus is being employed. We have applied all treatments in a closed room; when properly fitted and with proper ventilation, the inconvenience of the leaking sulphur gas is of little importance. A sufficient neutralization was obtained by placing cotton wads soaked with liquor ammonia caustica around the apparatus. Some odor is noticeable at times upon the starting of the inflow of the gas. The cause of it is that within the apparatus a tension will be produced which will make the gas escape through the leaks. We would advise that the work be done in the open whenever this is possible.

The volume of gas within the apparatus with a radius of 15 cm. and a height of 95 cm. is

found according to the formula, V equals r or 15. .95 equals 67150 ccm. 1 kg. liquefied SO_2 produces at 0 degrees and 760 mm. of barometric pressure, 349.5 liters of gas or at 20 degrees, 375 liters of gas. For one cubic meter of space one needs 10,000 ccm., equal to 10 liters of SO_2 gas. Therefore, for a density of a given volume one needs; for 10,000 ccm, 0.286 grams; for 1000 ccm., 0.0286 grams; for 67,000 ccm., 1.9162 grams; or for the apparatus above, 2 grams.

In	weighing	off	30	gr.	S02	a	concentration	of	15	vol.	%	is	obtained		
"	"	"	35	"	"	"	"	"	17.5	"	"	"	"		
"	"	"	40	"	"	"	"	"	20.0	"	"	"	"		
"	"	"	50	"	"	"	"	"	25.0	"	"	"	"		
"	"	"	60	"	"	"	"	"	30.0	"	"	"	"		
"	"	"	70	"	"	"	"	"	35.0	"	"	"	"		
"	"	"	80	"	"	"	"	"	40.0	"	"	"	"		
"	"	"	100	"	"	"	"	"	50.0	"	"	"	"		

Supporting Therapeutics

In order to procure also under the bandages after gassing has taken place, a strong and effective after-effect, we have employed during the experimental periods two therapeutic agents which were placed at our disposal by the Chemical Works Marienfelde, Berlin. They are first a liquid which can be had under the trade name of Sulfoliquid, and second a wound dusting powder manufactured by the same factory, which frees sulphur dioxid—it is called Sulfofix. Sulfoliquid possesses a pungent odor of sulphur dioxid, and according to Breidert (1920) it is a clear, slightly yellowish liquid of a somewhat viscid character, which intended for a mange remedy is manufactured by a patented process. Sulfoliquid is a highly concentrated, strongly viscous solution, of a composition of various salts, which upon contact with organic substances set free sulphur dioxid; 100 grams of Sulfoliquid contain about 11 grams of the dioxid of sulphur, a quantity representing about four liters of SO_2 gas.

The wound dusting powder, Sulfofix, is also a composition of salts freeing SO_2 when coming into contact with wound secretions. It is manufactured in three different strengths. Upon contact with wound secretions, a reaction of both components takes place freeing again SO_2. A similar reaction had been obtained by Klein with his powder. After sufficient cauterization, other therapeutic agents of a lesser drying and disinfecting power were employed —iodoform, and later after a sufficient epithelial formation, pine tar, etc.

For the fixation of the gas coefficient of density most advantageous for the treatment of thrush, we used a horse suffering from a dermatitis verrucosa on one of its limbs up to the tarsal joint. It had been operated upon about a year before without any lasting success. Beginning with a concentration of 15 vol. % and a period of gassing of a quarter of an hour, we increased the dosage until we obtained the wanted results and healing at a dosage of a concentration of 30-35 vol. % through half an hour.

Experimental Treatment

Dermatitis verrucosa. Patient, dapple stallion, light draft type, seven years; suffered from a dermatitis verrucosa on the right hind leg up to the tarsal joint. The skin sclerotic, diffuse, showing numerous highly reddened papillomata from a pea to a walnut in size, issuing a very cheesy and pussy secretion of a bad odor. The animal had been operated on a year before without any lasting effects and had been treated of late with acid salicyl., tannoform, lenicet aa 15, talc. 50.0. At first the patient was treated with a weak concentration of gas. We began with 15 vol. % and increased the SO_2 ratio up to 35 vol. %. In all the horse was gassed six times.

Through the first treatments with the weak density, the circumference grew smaller only for 1 cm. After the concentration of 30-35 vol. %, we could prove a decrease in circumference for about 4 cm. Correspondingly the limb had thinned out above and below also. Rubor decreased also, and immediately after the first treatments, the secretion likewise grew less, but it only ceased when 30 vol. % had been employed. Only with a concentration of 30-35 vol. % could we show scar formation. Partly proliferations fell off or they were easily removed. After the sixth gassing, the proliferations had ceased and hair had grown out again, the skin having become dry and pliable. So all traces of pachydermatitis had disappeared.

Reexamination occurred six weeks later. The owner had been advised to present the animal again upon the least aggravation. This he did not do, so the animal must have been cured.

The single treatments were executed in periods from 6-10 days, their whole course lasting 39 days.

During treatment the horse could be used for its work only after the last and the strongest concentration, the patient being kept in the stall for about ten days.

As an aid to the gassing, Sulfoliquid was used, the owner being instructed to use for

about two weeks ablutions of this preparation. They prohibited formation of bad odors and annoyance of the patient by flies.

Disadvantageous sequelae could not be noticed. The horn became somewhat hardened in the upper layers and proved a little harder to cut. Since the horn was not affected, the experimental treatment suggested for the treatment of thrush that all horny parts covering thrush proliferations ought to be removed if at all possible in order to obtain a direct action of the gas upon the moist proliferation tissues (see Neumann and Ruescher B.T.W. 1921).

(The author's table showing treatment of five cases has been omitted.)

Conclusions

1. We have succeeded by treating thrush with SO_2 to obtain a cure in a relatively short time.

2. SO_2 was employed in gaseous liquid and powdered state. The best caustic effect is to be obtained with the gas. Where the gas treatments are feasible, they ought to be preferred to the exclusive treatment with Sulfofix and Sulfoliquid. Still treatment also will be possible with Sulfofix and Sulfoliquid alone. The treatment however will extend over a longer period of time unless one adds a few highly concentrated gas treatments.

3. At the average complete results were obtained with three treatments of a density of 40 volume % with the time for exposure fixed at about a half hour and if needed with simultaneous treatments with Sulfoliquid and SO_2 dusting powder. To employ a still higher concentration of gas, we do not think indicated, since at a 50 vol. % very severe acid burns of the skin as well as of the fetlock were observed. Gas treatments may be given at an interval of from two to three days.

4. Removal of the horny portions to the extent of the separation of horn and matrix is always indicated. In case a rather strong hemorrhage ensues, gassing is only to be started after it has been stopped. A preparatory treatment with Sulfoliquid in the form of a bath or a bandage is advisable, since a beginning hemorrhage will stand a short time after. Superficial working over and cauterization of the granulations will follow. Operations upon the altered fleshy leaves were omitted purposely.

5. The treatment is entirely without danger to the patient and even in the most stubborn cases may be relied upon. Only an occasional inflammation of the skin of the fetlock which may be lessened with a protective ointment, has been observed at times; no other ill effects ever came up.

6. This method compares favorably with other methods for after one gassing, already the offensive odor has ceased and the secretion very much abated. Directly after gassing secretion will issue. Scar formations may be easily removed after gassing without any hemorrhages. In consequence of the after-effects of the treatment with SO_2, at the time of redressing large layers of granulations may be removed without use of a knife. The effects of gas upon the healthy tissues is much less than that upon diseased tissue. The cauterizing powders may be only relied upon on a moist medium. The gas will penetrate naturally much deeper into the finest proliferations than either a powder or a liquid. Recurrent attacks were never noticed to occur.

7. A solid pack dressing is always necessary as long as the new epidermal layers are lacking. The fixing of a light shoe always ought to be done as soon as possible if it is only to cheapen the cost of the dressing considerably.

SURGICAL TREATMENT

Indications

In dealing with this malady one has to choose between the medical and the operative methods. Without any doubt the medical treatment ought to be preferred in all lighter cases for reason that the patients may be used for service during the treatments. Still the treatment with therapeutic agents only will be successful where the pathological centers have been laid open completely and thus have been rendered liable to the effects of the various agents employed. Therefore any kind of treatment of thrush or canker has to begin with the removal of the horny tissues within the diseased area; then only one has to come to the conclusion as to which method will be the very best to use. The borders of the pathological areas are not always just marked by partial or complete lack of horn but often just by an undermining process of seemingly healthy horn, i.e., near the supports of the wall, the sole and different portions of the wall. The guiding principle in dealing with thrush therefore ought to be the fixation of the extent of the undermined area, then the removal of all this horny tissue up to the point where the physiological junction

between horn and matrix becomes apparent. In extended cases operative treatment works faster and with greater reliability.

Technic

In case the shoeing of the diseased hoof seems possible after operation, one ought to have the foot prepared for shoeing and an open shoe ought to be fitted; at the same time the horny frog and the sole have to be worked out. the hoof cleansed and bathed in a ½% solution of formalin. One anesthetizes the nerves of the fetlock or the nervus tibialis, throws the animal generally upon the diseased side, binds the diseased foot diagonally to its opponent, places the sole by use of cushions and mattresses into a comfortable position, places the tourniquet, cleanses again and disinfects.

Conditions limited to the sole may be operated upon while the animal is standing. The first step of the operation consists in the removal of the undermined horny tissue, that is, of the frog, the quarters and the sole. In so doing it is best to commence near the edge of the proliferation which sometimes covers the edge of the horn in mushroomform; then one reaches with the grooved knife under the horn and cuts it out in larger or smaller fragments as the case may be fixing it with a pair of forceps. The better the horn has been thinned out previously, the better one will succeed in so doing. By this method it is almost impossible to injure the matrix. Special care ought to be given to the supporting walls and the quarters. Removal of the undermined horny wall may be executed in two ways.

1. The horn of the wall, mostly of the sides or the quarters, is carefully chiselled off piecemeal close to the junction between horn and matrix; the rest is to be removed with the grooved knife as described above. Then one proceeds to work out a groove within the cutting surface of the protective layers, thereby forming an edge of sound horny lamina of ½ cm. in width although quite thin around the free matrix. This edge almost is in the plane of the matrix. In this way one has a fixed point useful for tampon dressings as also an even plane upon which to place material for the tamponade. Prolapse of the matrix which frequently occurs if a steep horny wall borders the matrix, will not happen when this method is used. Since by this plane of incision the horny leaves of the sole and the sides are cut transversally and the fleshy leaves due to their elasticity will be retracted, some small spaces will form between the horny leaves where consequently wound serum will gather and proceed upward between the leaves. This condition not only prevents the formation of a seam of young horn, but literally makes new undermining processes probable, which fact renders it imperative during change of dressings to remove the new sector of the wall. Thus one gets closer and yet closer to the coronet retarding healing for many weeks.

2. In order to overcome these disadvantages the whole sector of the wall in the region of the undermining process may be removed. Here two furrows following the direction of growth of the horny leaves have to be cut out, one in the outer edge of the undermined surface, the other on the outer edge of the quarter. The sector of the wall between these two furrows is raised and pulled off by means of forceps (extirpation of the cartilages of the hoof). It is true that in this way one bares the upper part of the matrix which in most cases is sound, yet one stops from the very beginning all further processes of undermining. The healthy matrix will cover itself very rapidly with new horn and duration of recovery depends entirely upon replacement of the originally diseased portion.

If then the scene of proliferation is fully bared, one scrapes with a sharp spoon ruthlessly near the quarters and the edge of the sole, even including removal of the bone oftentimes involved whenever it appears porous, spongy and of a yellowish grayish color. The matrix of sole and frog has to be scraped until the pigmented layers of the rete disappear. The middle and the side furrows of the frog have to be worked out to become wider and rounded off. Loose tissue fragments on the frog are removed by scissors, also the hair of the coronet, the upper parts of the quarters and the upper pads. After rinsing the wound surfaces with $H^2 O^2$, one covers it with heavy gauze. After this if at all possible one fastens the shoe and then finishes up with a tamponade (oakum, etc.). This dressing should not be removed for fourteen days. If shoeing is impossible the dressing ought to be protected by a leather shoe or a sack.

If the wound surfaces ooze too much, dressings ought to be changed every second or third day. Special attention ought to be paid to the control of granulation and the newly formed horn. In case several feet are diseased it is advisable to operate upon the worst one at first. In case of a lesser involvement the feet on the diagonal may be worked upon simul-

taneously. The duration of convalescence will either be between 3-4 weeks or 4-6 weeks.

Literature

Harms (1918): *Die Gasbehandlung der Pferderaude. Naturwissenschaften* 6. Jahrg. Heft 46.

Neumann und Ruescher (1921): *Zur Behandlung des Pferdekrebses mit S o 2. Berliner Tierarztliche Wochenschrift.*

Statistischer Veterinaerbericht Der Reichswehr fuer 1920.

Pfeiffer. Dr. W.: *Operationskursus,* Berlin 1921, S. AUFL.

Woolridge George H. F.R.C.V.S. M.R.I.A. F.Z.S.: *Encyclopedia of Vet. Med. Surgery and Obstetrics.* Vol. 2.

Prenatal Poisoning by Tissue Extract (Cytost) and Its Effects*

By Dr. Orville E. McKim, from the Research Laboratory of Dr. Fenton B. Turch, New York City

Among the various causes given for disease, acute and chronic, there is often to be noted some slight reference to "heredity" or "hereditary tendency". Until recently there has not been made a clear distinction between hereditary characters and congenital changes. Hereditary characters are by some supposed to be fixed and practically unchangeable, while congenital changes are those which occur only during intrauterine life. We as veterinarians are daily coming in contact with a morbidity and mortality in the young that is quite beyond our clinical ability to interpret or solve. We have observed on many occasions that there is a great morbidity and high mortality in the young when the pregnant female is underfed. We have also noted that the same conditions resulted when the pregnant female was suffering from an illness of either bacterial or idiopathic origin.

The same consequence is recognized in the young from any other interference with the normal metabolism of the prospective mother, viz, injuries, physical or chemical in nature, confinement in small quarters, etc. The great number of abnormalities encountered in the young of various species from apparently different reasons induces us to seek enlightenment as to the etiology. We may ask: How do these conditions produce these abnormalities? What agent or influence is responsible? Is there one common cause, and if so, what is its origin?

First of all, we must take into consideration the manner in which the fetal bodies are nourished. We know the structure and function of the placenta with its ramification of blood vessels. We know that through these blood vessels an interchange occurs between mother and young. Much excellent work has been done in ascertaining to what extent this interchange of blood and its products is carried. Amatruda in recent experiments found arsenic in the liver of the embryo and placenta of the mother that had been injected with neoarsphenamin. Plass found that creatinin exists in the same concentration in both maternal and fetal blood. Kingsbury and Sedgewick obtained the same average from uric acid. Slemons and Morris have shown that the urea and nonprotein nitrogen content is the same. Kronig and Fuhr found the freezing point of maternal and fetal blood to be the same. This indicates that they have the same osmotic pressure. Hence the interchange may occur equally well in either direction.

The results obtained by the aforementioned investigators leads us to infer that there is every reason to believe that a weak, undernourished, ill or injured prospective mother must in some way poison her young. Clinical evidence of a prenatal poisoning is met with daily, but a satisfactory explanation of the poison or toxin involved has not been available. Conditions from which prenatal poisoning result are so numerous and diversified as to lead to the belief that there must be a variety of poisons and toxins as well. It is hard to conceive that the same poison or toxin is formed by a deficiency diet as in illness or local injury.

Cytost Plays Important Role in Disease

In a recent paper by the writer, read before this association, it was shown that a most important role was played by tissue extract (cytost) as an etiological factor in disease. It was clearly demonstrated that this intracellular force is not only necessary to cell division and metabolism, but is also responsible for patho-

*Presented at New Jersey State Veterinary meeting, Jersey City, Jan. 10, 1924.

logical conditions and the end of life, or death. Low concentration is physiological; medium concentration is pathological; high concentration is lethal. Sufficient evidence was given to establish the fact that, regardless of the method used to extract or liberate cytost, the same results ensued. There was ample proof offered that there is not one poison formed by a punctured wound, another by starvation, and still another by chemical or thermal agents.

We must turn to the study of the cell together with its products, cytost and anti-cytost, in our endeavor to find the solution of the problem of prenatal poisoning. There is no denying that environment is a part of both somatic and germ cell life. Albumin is environment until taken up by somatic cells, and there is no way as yet of determining at just what point it ceases to be environment and becomes living matter. Somatic cells are affected by outside influences or environment. Germ plasma cells are influenced by environmental conditions; the mother.

When a pregnant female is underfed or prevented from utilizing its food supply, it must break down, (autolize), its own tissue to supply the caloric deficit. This mechanism which induces autolysis in total or partial starvation is unknown. The tissue breakdown termed autolysis is a normal biological process, and the unknown products set free are termed metabolites. The metabolites when acumulated in excess within the organism, as may occur in total or partial starvation, produce well known symptoms and pathology grouped under the term "toxemia of starvation". When these metabolites are formed in excess from bodily exercise the symptoms and pathology are classed as "toxemia of fatigue". When from any wound or other tissue injury the metabolites form in excess by autolysis, the symptoms or pathology, called "shock" are expressed as "toxemia of shock." When these metabolites form in excess from autolysis during the period of pregnancy the symptoms and pathology are mentioned in literature as "toxemia of pregnancy". Extreme fatigue, effort syndrome, etc., are often the predominating symptoms common to all these conditions, partial or total starvation, (inanition), over-exercise, over-work, shock from wounds, or surgical operations, and, in certain phases of pregnancy. Bainbridge states that the products are of two kinds, namely lactic or carbonic acid and metabolites other than acid. What is this "metabolite other than acid" which is so active in producing harmful effects in toxemias of starvation, fatigue, shock and pregnancy? This ought to be made clear and decisive.

Not a Foreign Protein Poison

It is but recently that the experimental evidences presented by Dr. Turck in the past thirty-five years have been universally accepted; that is, that the tissue toxin itself is the poison responsible for these pathological changes. All the methods of extraction of tissue toxin by water, heat, coagulation, and finally reduction by burning tissue to an ash, yield the same active principle varying in concentration according to the method used. Because this active principle is not a manufactured product, but of and from the cell, it is named cytost, from the Greek word, "cytos", a cell. It is not a foreign protein poison, being neither foreign nor protein. It is derived from homologous, not foreign tissue, and the protein is burned off when reduced to an ash. In other words it is not a poison at all. This tissue substance which Dr. Turck calls "cytost" is in a low concentration a stimulant to cell division and metabolism, and in high concentration it acts in excess of the normal on the splanchnic area, (endodermal zone) and produces a certain definite reaction and death. Cytost is counterposed by an anti-body called anti-cytost, found in the blood serum.

Experimental Work

In the experimental work which follows it is our endeavor to demonstrate by various types of experiments on animals of different species, the principle of the action of the specific tissue toxin known as cytost. Since one of the most important and significant applications of its activity is, as we have stated, one of the most vital factors in pregnancy, we have performed a number of experiments on both mother and offspring during that most critical period. The experimental work is as follows:

1. Autolysis induced by forceful feeding (the role of extractives).
2. Breeding of mice with injections.
3. Injections, toxemia of pregnancy.
4. Effect on egg-laying production of hens.

(Dr. McKim included a number of tables in his paper, tabulating his experimental work, which have been omitted here, as it is believed a brief summary of the results will be sufficient for the general practitioner.)

Effect of Extractives on Pregnant Bitches

Experiments were carried out to determine the effect of feeding pregnant bitches with meat

and meat extractives, and meat freed of extractives, with and without the addition of B. coli communis, noting the effect upon the offspring. With those animals that were fed with extractives and B. coli communis, the offspring all died in periods of time ranging from one hour to two weeks. One animal which died three weeks after birth developed an ulcer of the stomach and died of hemorrhage from the ulcer. The other animals showed general degenerative changes in the tissues of all the organs. Foci of autolysis without round cell infiltration were observed in the stomach, liver, kidneys and other organs. The effect on the offspring as shown in one of the series of experiments is of special interest, as it is evident that autolysis induced by deficiency diets is undoubtedly transmitted by the mother to the embryo or fetus.

In pregnancy, tissue breakdown can be seen to affect both mother and offspring. None of the puppies of the animals whose tissues had been poisoned by the liberation of homologous cytost, survived.

The Breeding of Mice with Cytost Injection

A series of cytost injections was carried out in a number of mice under most favorable conditions. From these experiments it was found that injections of high concentrations of homologous cytost produced death, as in the case of other animals, while injections of low concentrations of cytost, repeated at regular intervals produced immunization of mother and offspring, so that the mortality is very appreciably reduced, in comparison with control groups; while injections of high or low concentrations or heterogenous cytost failed to produce any effect at all.

Toxemia of Pregnancy

A further series of experiments has been carried on in pregnant cats which have been injected with cytost. In all cases where the cytost was specific, the injection, if high in concentration resulted in abortion, with vomiting and shock, none of the kittens survived, but in the surviving cats, there was produced nephritis, either chronic or acute.

Effect on Egg-Laying Production of Hens

In a series of experiments carried out on chickens, in which one flock of ten pullets was injected with low concentration of homologous cytost and another with a medium concentration, egg production in the former flock was very greatly in advance of that of the control flock; while in the flock injected with the medium concentration egg production fell markedly, and the hens manifested the symptoms of toxemia. The results show very definitely that cytost in low concentration stimulates cell mitosis and metabolism while in medium concentration, it causes tissue catabolism and breakdown.

Discussion of Results

The foregoing knowledge gleaned from the protocols, literature and researches of Dr. Turck is an irrefutable revelation of a force that is the primary etiological factor in many diseases of hitherto unexplained origin. To quote Dr. Turck: "Imagination, is the light that projects the experimental image beyond the dull plane of traditional belief and quickens the eye to see more and the mind to comprehend." Is it not time for us to explore beyond the dull plane of traditional belief? Deeper and fuller consideration of the effects of prenatal poisoning or congenital tendencies is essential to our ultimate solution of the problem of great morbidity and high mortality in the young. Rachitis, gastro-intestinal disturbances, pneumonia (acute and chronic), and extreme susceptibility to the ravages of infection are always the aftermath of prenatal poisoning.

Noel Paton and the physiologists of the University of Glasgow show by experiments in puppies that vitamins as such are not the factor in rickets, but simply the same factor we find in all bone and joint diseases.

Local and general inanition will cause tissue breakdown and this poison which is the exclusive cause produces these lesions. This poison referred to is none other than cytost. When a prospective mother is weak, undernourished, ill or injured, the tissue toxin (cytost) liberated from her disintegrating cells is transmitted by osmosis through the placental vessels to the circulation of the fetus.

Kronig, Fuhr and others substantiate the results by Dr. Turck. It was found that when a pregnant female was injected with a lethal dose of homologous cytost, and a death from shock resulted in from thirty seconds to three minutes, the same pathology was demonstrated in the fetus as in the mother. If the toxic effects of a lethal dose of homologous cytost is transmissible from mother to young in from thirty seconds to three minutes, what is the effect of smaller and repeated doses? The experimental findings are identical with clinical data. If the toxin, (cytost) is transmissible,

this ought to be demonstrated by a very simple experiment which every veterinarian can make. This has already been done. Two groups of mice, one male to nine females are placed in separate cages. One group was injected with high concentration homologous cytost before impregnation. This resulted in defective offspring due to the damage produced in the mothers before mating. The second group was injected with high concentration homologous cytost after mating and during the pregnant state. Result: the offspring showed a high mortality ranging from 80 to 85 per cent. None of the offspring reached the adult stage. This indicates a great economic loss to breeders, as the same results were found in all the animals under experiment.

These experiments taken with what is known by clinical observation show:

1st—The offspring must surely be affected when metabolic disturbances are present in the mother.

2nd—Defective offspring rarely reach the adult stage.

3rd—Regardless of when the damage is done to the prospective mother, the same effect is produced.

4th—Defective offspring do not have the resistance necessary to cope with the ravages of infections.

General Conclusions and Suggestions

It would appear that this was a hopeless situation for animals bred under domestic conditions are subject to the same dangers, even when hygenic and aseptic measures are met. We must therefore look to an increase in natural immunity in the prospective mother for our solution to this problem. Breeders have endeavored to protect the female against metabolic disorders by exercise, open air and proper feeding. This is not sufficient under our present knowledge. A specific and definite increase in the animals' antibodies must be attempted rather than an exclusive reliance on rules of hygiene.

Experimental and clinical evidence show that immunity is established by small injections of homologous cytost at stated intervals. This is in full accordance with the well known biological law that, that which destroys will in physiological doses stimulate normal reaction. Passive immunity combined with active immunity produces the best results

Cytost in:

Low concentration, physiological inaction, stimulates cell division and anticytost production or immmunity.

Medium concentration, pathogenic in action.

High concentration, lethal, causing death.

Bibliography

1. Amatruda, F.—Jour. A. M. A. Vol. 81, No. 24, Pg. 2009.
2. Plass, E. D.—Bull. John Hopkins Hosp. 28-297, Sept. 1917.
3. Kingsbury, F. B. and Sedgewick, J. P.—Jour. Biol Chem 31-264, July 1917.
4. Slemons, J. M. and Morris, W. H.—Bull. John Hopkins Hosp. 27-343, Dec. 1916.
5. Kronig & Fuhr—Quoted from Williams' Obstetrics.
6. Bainbridge, F. A.—Phys. of Muscular Exercise, J. A. M. A. 1919, pg. 179.
7. Paton, Noel—Further facts about Rickets, Jour. A. M. A. June 25, 1921, pg. 1844.

African zebras, although noted for their wildness, have been domesticated and will interbreed with the horse or the ass

Lavage and Gavage in Canine Practice

By J. G. Horning, D. V. M., and G. B. Kirkwood, D. V. M., Houston, Texas.

Lavage Stomach Washing

Its use first attracted our attention by its general practice among pediatricians. At first our efforts were somewhat crude and at times almost hopeless in trying to conform a practical technic for dogs and cats. After a period of several years we have successfully arranged a technic that is simple and practical in its use for all breeds of dogs and cats. In vomiting whether due to chronic indigestion, acute gastro-enteritis, or a subacute attack of chronic gastritis, lavage is of great value. The dangers are practically nil. Our only accident was in the case of a Boston Terrier who on removal of the tube closed his mouth, bit off several inches of the tube and swallowed it; however, this did not prove fatal.

Apparatus Used

No. 1—French infant's stomach tube.

No. 2—Rubber catheter with funnel attached (size 18F).

No. 3—Rubber catheter with funnel attached (size 14F).

No. 4—Rubber catheter with medicine dropper attached (size 10F).

The Operation

For lavage or gavage, dogs are best handled on the operating table, although after the operator gains sufficient confidence the animal can be almost as easily handled in the home as at the hospital. After the animal is placed on the table the assistant opens the dog's mouth. The tube is moistened with the fluid to be used in the washing and passed over the base of the tongue into the esophagus. When it has entered the esophagus it should rapidly be passed into the stomach. It is advisable to wrap cats, kittens, and small dogs in a towel with the head exposed as in Fig. 3. With the tube in position, hold the funnel the length of the tube above the patient's body. The water, which has been boiled and allowed to cool, may then be poured into the funnel.

The apparatus shown under Figs. 2 and 4 is used. It should always be boiled before using. A one per cent solution of boric acid may be used if much mucus is present. The amount introduced into the stomach at one time varies according to the age and size of the patient. For pups and kittens one week old, a teaspoonful up to one ounce of boiled water or boric acid solution, may be used; six weeks old, a tablespoonful to two ounces; six months, one to six ounces, according to size. It is rarely advisable to give more than six ounces at one time. The fluid is allowed to run into the stomach, the patient is then tilted with his head down, the tube lowered, and the fluid siphoned out. This process is repeated until the fluid returns perfectly clear.

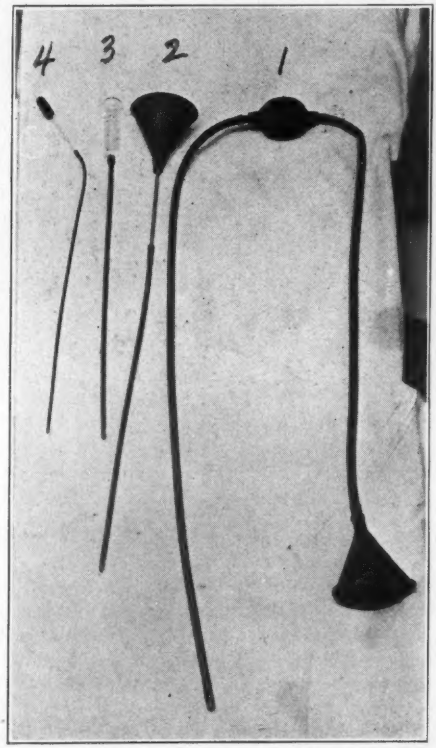


Fig. 1; 1, French infants' stomach tube; 2, Size 18F rubber catheter with funnel; 3, Size 14F catheter with funnel; 4, Size 10F with medicine dropper.

Indications

In acute vomiting cases usually one washing daily for five or six days is sufficient. In chronic indigestion with regurgitation, once a day or once every second day is all that is necessary, while it is seldom necessary to wash

the stomach oftener than twice in twenty-four hours. One thing to bear in mind and as im-

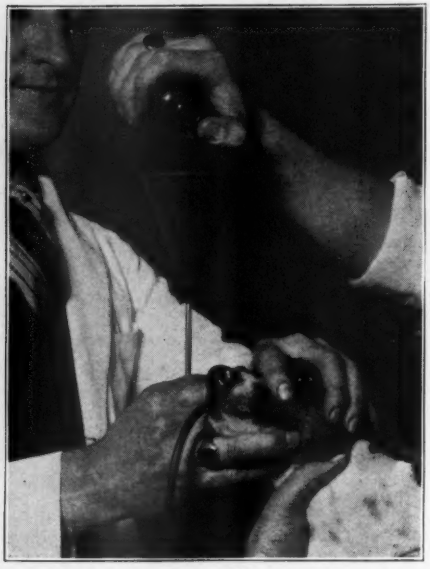


Fig. 2

portant as the stomach washing, is the giving of food suited to the digestive capacity.

Cases of indifferent appetite and limited food capacity without vomiting are greatly benefited by this treatment. In this class, stomach washing once a day will be followed by a surprising improvement, showing that there may be stomach disorders of considerable importance without vomiting, the only symptoms being loss of appetite and malnutrition.

Gavage (Feeding by the Stomach Tube)

The tubes required are the same as for lavage. The technic is the same as it is always well to clear out the stomach with warm water before each feeding.

Gavage will be found useful in obstinate vomiting, in severe cases of pneumonia, grave intestinal diseases, malnutrition, exhaustion, narcosis, etc.

Obstinate Vomiting

Patients that cannot retain a teaspoonful of water administered by a spoon, will retain a tablespoonful to one ounce of water given through a tube. It is well to use gavage only once every four or six hours, with one-half the quantity of food given in health.

One thing to bear in mind is that the tube should be merely dipped into the solution that is to be used. After administering the food, the tube should be compressed and quickly withdrawn. The food selected should be thin dextrinized gruels or broths from which the fat has been strained off. This has answered well in most cases.

In severe cases, as pneumonia, grave intestinal diseases, etc., gavage may save the life of the patient. In nearly all of these cases insufficient nourishment is taken to support life; therefore, gavage may be employed for several days at a time.

Predigested Cereal Foods

To a sauce of well cooked oatmeal or rice at the customary temperature, add one or two teaspoonfuls of Fairchild's diastasic essence of pancreas, or 15 grs. of Fairchild's dry extract of pancreas. Stir for a few minutes before giving. It is well to bear in mind that when ferments are added to very hot foods their power becomes impaired.

Peptonized Milk

Into a clean graniteware saucepan place one pint of milk, four ounces of water and the contents of one of Fairchild's peptonizing tubes, or five grains of pancreas extract and 15 grains of bicarbonate of soda. After mixing thoroughly, pour into a jar, place the jar in water as hot as can be borne by the hand, about

Fig. 3

115° F. This should be heated for twenty minutes. At the end of this time it may be placed upon ice until required. If the milk

is to be kept for any length of time, it should be brought to a boil, to prevent the formation of too much peptone, which renders the milk

Fig. 4

bitter. Usually these patients badly need water. If there is no tendency to vomiting, a large quantity of water may be given with the nourishment so that they may receive as much liquid as they do in health.

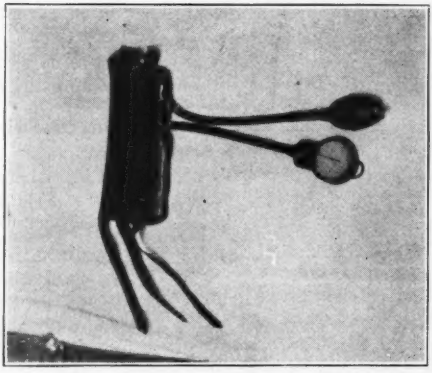
Malnutrition, Exhaustion, and Narcosis

In these cases the food should be predigested cereals or peptonized milk, in quantities suitable to the age and size of the patient. Before the next feeding it is always well to introduce a small amount of water and withdraw it to see if the food has been properly digested. If the vitality is not at too low an ebb at the commencement, a daily increase in strength and vigor is noticed, which proves that the power of assimilation persists after the desire or the ability to swallow food has passed, and that we must never regard such a case as hopeless as long as the patient is breathing. On occasions too numerous to mention we have noted that after a few days of feeding by gavage, the patients will take food of their own accord.

Conclusion

Due to the remarkable results obtained from lavage and gavage we feel that this should be adopted universally by all of our fellow practitioners.

Tube used	Breed	Age	Wt.	In. of Tube Ins'ted
No. 4	Boston	1 wk.	10 oz.	5
No. 1	Cur	4 mo.	12 lbs.	17
No. 1	Fox Terrier	1 yr.	16 lbs.	16
No. 1	Spitz	3 mo.	8 lbs.	13½
No. 2 or 3	Peke	1 yr.	3½ lbs.	10
No. 2 or 3	Pom	3 yrs.	4 lbs.	9
No. 1	Russian Wolfhound	3 yrs.	85 lbs.	25
No. 1	Shepherd	1 yr.	55 lbs.	23
No. 2 or 3	Persian cat	1 yr.	4 lbs.	7
No. 4	Persian kitten	2 wks.	4 oz.	3½



Revised sleeve for blood pressure, designed by Dr. J. G. Horning. Made of leather with three straps and heckles.

Hydrolized sawdust, a by-product in the manufacture of industrial alcohol, is not a satisfactory feed for dairy cows at present prices of feeds and cost of treating sawdust, says the United States Department of Agriculture. Although this product contains a large proportion of material of no feeding value, it can be used in limited quantities for dairy cows when ordinary feeds are very high in price.

Many disorders have their origin in the improper feeding of cotton seed products. Young calves should not be fed any cotton seed products. Only small quantities of cotton seed products should be fed for a period longer than 100 or 120 days. Cotton seed products are valuable feeds when supplemented with other feeds in the fattening of cattle, because these products stimulate the appetite and they contain valuable protein constituents.

The Relation of Domestic Animals to Anopheles

By M. A. Barber, Special Expert, and T. B. Hayne, Technical Assistant, United States Public Health Service.

That domestic animals may be a means of protecting man against malaria was early suggested by certain Italian writers. Bonservizi* concluded that domestic animals in the city of Mantua (Mantova) afforded protection to the inhabitants against Anopheles. In recent years the subject has been brought into more prominence through the researches of Roubaud. According to this author, A. maculipennis, the chief malaria carrier of northern and central Europe, has come to prefer domestic animals to man; it has become "zoophilic" even to the extent of a change in the maxillary dentition; and this change in the blood-seeking habits of the Anopheles has been a large, if not the chief, factor in the diminution or disappearance of malaria from certain well-populated regions of Europe, even in the presence of an adequate number of Anopheles.

In this connection it has seemed to us worth while to publish a few observations on the relation of domestic animals to Anopheles in the United States.

1. The Attraction of Man for Anopheles as Compared With That of Domestic Animals.

In a series of experiments carried on at Stuttgart, Ark., in 1920, man-baited and pig-baited mosquito traps were compared. The traps consisted of sheds with board roof and dirt floor, all of the same dimensions, 8 by 8 feet at the base, 8 feet high at the front, and 5 feet high at the rear. The sides were inclosed with mosquito netting, except an ample space left open at the bottom for the admission of mosquitoes. Three traps were arranged in a row, allowing an interval of 8 feet between each. All were about equally distant from Anopheles-breeding rice fields, the nearest of which was about 100 yards away.

The man-baited trap contained nightly one and sometimes two persons (white), rather inadequately protected by a smaller net placed immediately over the bed. The pig-baited trap contained two pigs not protected by net or screen, except in the last experiment. A control trap, containing no source of blood, was placed midway between the other two traps. Both men and pigs remained all night in the traps, and the mosquitoes caught were collected at dawn. The results of this experiment, which was repeated in four successive nights, are given in Table I.

Night of catch	Man-baited trap			Pig-baited trap			Control trap		
	A. quadrimaculatus.	A. crucians.	Total, both species.	A. quadrimaculatus.	A. crucians.	Total, both species.	A. quadrimaculatus.	A. crucians.	Total, both species.
August 5	14	25	39	61	27	88	30	9	39
6	34	132	166	96	30	126	17	3	20
7	112	87	199	109	15	124	23	1	24
8	44	9	53	148	8	156	10	0	10
Total	204	253	457	414	80	494	80	13	93
Percentage females	92.1	99.6							
Percentage of females blood-engorged	11.7	3.2	.....	94.2 48.2	100.0 43.8	.....	50.0 20.0	53.9 0.0	.....

Two experiments with the same traps, but with no control, were carried out on the nights of August 3 and August 4. These gave the following catches: Man-baited trap—A. quadrimaculatus, 73; A. crucians, 85; pig-baited trap—A. quadrimaculatus, 115; A. crucians, 50. Including these two experiments, the totals of both species caught on six successive nights are as follows: Man-baited trap, A. quadrimaculatus, 277; A. crucians, 338; both species, 615. Pig-baited trap, A. quadrimaculatus, 529; A. crucians, 130; both species, 659.

*Bonservizi, F.: Corriere Sanitario, xiv, 1903, p. 61.

On August 9, at the conclusion of the first series of experiments, the pigs were put into a screened box in order to test them under the same conditions obtaining in the man-baited trap, where persons were more or less protected by nets. This box was placed in the former control trap, and the original pig trap was left empty as a new control. The man-baited trap contained one person. Unfortunately this experiment was somewhat marred by a thunderstorm with a high wind, to which the man-baited trap was somewhat more exposed than the other traps. The results obtained were: Man-baited trap, A. quadrimaculatus, 35; A. crucians, 1; both species, 36. Pig-baited trap, A. quadrimaculatus, 66; A. crucians, 5; both species, 71.

The weather during these experiments was hot and dry until the afternoon of August 6, after which time the nights were moist, but with no rain until about 3 a. m. of August 10. The wind at night was southerly—that is, from the main breeding place toward the traps—but very little wind occurred until the early morning of August 10, when it blew strongly from the northwest.

Summarizing these experiments, it appears that on some nights the man-baited trap proved more attractive to the Anopheles, and on others the pig-baited trap. The totals of all species are nearly the same. A. quadrimaculatus seemed to prefer the pig bait 5 nights out of 7 and A. crucians but 3 out of 7. The totals of each species indicate a preference on the part of A. quadrimaculatus for the pig and of A. crucians for the human bait. The numbers, however, are too small and variable to justify any final conclusion in this matter. In sum, there seemed to be no striking difference in the two baits as regards attractiveness for Anopheles.

The proportion of females caught in both human-baited and pig-baited traps was high, as is usual where there is a source of blood to attract mosquitoes; and, as might be expected, the proportion of blood-engorged females was highest in the trap containing the unprotected pigs. The night when the pigs were screened, over 91 per cent of the Anopheles caught in that trap were females, and only 10.7 per cent of them were blood engorged. There was no other source of blood in the immediate vicinity of the traps.

Man-baited and pig-baited traps were again compared under winter conditions such as obtained at Camilla, Ga., in mid-February. Traps were placed at the edge of a cypress swamp where winter breeding was extensive, and the experiment was repeated on two successive nights. The first night the pig-baited trap caught 11 Anopheles, most of which were blood engorged. The man-baited trap caught 8, of which 5 contained blood. In both traps all Anopheles were females of A. crucians species. On the following night the pig trap was moved to a new place and set as before. The catch was as follows: A. crucians, 49—all females and about two-thirds of them blood engorged; A. quadrimaculatus—one female with blood. The man-baited trap caught 20 A. crucians, of which 7 were blood engorged. During the second night the temperature ranged from 69° F. at 4:30 p. m. to 45.5° F. at dawn. Mosquitoes were observed to bite at various hours during the night, even after the temperature had fallen to 46° F. Two culicines were found in this trap also. In both experiments man and pig baits remained in the traps all night and were not screened against mosquitoes.

Some observations were made to determine whether persons exposed at night to free Anopheles in the presence of domestic animals in a stable would be attracted by mosquitoes. A small stable housing about 3 mules and 3 cows was chosen, and 2 persons entered it on a warm night in September shortly after dark. Three A. quadrimaculatus were caught while biting the hand, face, and neck of a man standing within 6 feet of a mule, and a fourth was caught on the face of a man standing 2 or 3 feet from an animal. Relatively few Anopheles were flying about.

Further experiments were made by means of a lantern-chimney mosquito cage provided with a special rim so that it could be placed over a man's finger and in direct contact with the skin of an animal. Anopheles, all, or practically all, A. quadrimaculatus, were placed in this cage and the rim was applied to an area, previously clipped and shaved, on the neck of a mule. A finger was placed in this cage and kept in immediate contact with the skin of the animal. No net intervened between the mosquitoes and the finger or the mule. The surface of human skin exposed to bites was about one-third that of the mule. At first, about 13 mosquitoes alighted on the mule to 3 alighting on the finger; later, the proportions were 15 to 5 and 7 to 4, respectively. Mosquitoes became engorged with blood on both finger and mule. The color of the mule was black, that of the finger, white. The experiment was re-

peated on the following day with essentially the same results.

2. Susceptibility to Malaria Parasites of Anopheles Previously Fed on Pig Blood.

In the course of some infection experiments, opportunity was offered to test the infectibility for malaria parasites of Anopheles previously fed on pig blood. A batch of A. crucians with a few A. punctipennis intermingled was fed on the blood of a man, not a carrier of malaria, and a second batch on a pig. Blood-engorged mosquitoes were separated and the empty ones rejected. Four days later, both batches were exposed to a malaria carrier having many benign tertian gametes. The lot previously fed on pig blood showed a slightly greater avidity for human blood (21, or 54 per cent, becoming engorged) than the lot previously fed on pig blood (18, or 46 per cent, becoming engorged). At the same time a third cage, not previously exposed to any source of blood, was exposed to the carrier. The mosquitoes had all been bred from pupae in the laboratory. After exposure to the malaria carrier, all blood-engorged ones were separated and the survivors were at various times dissected and examined for oocysts.

Of the lot fed twice on human blood, 8 A. crucians were dissected, all of which were positive for oocysts. The average number of oocysts per mid-gut was 155. Of the lot previously fed on pig blood, 13 A. crucians were dissected, of which number 12 were positive for oocysts, the average number of oocysts per infected mid-gut being 205. Of the control lot, 12 A. crucians were dissected, all of which were positive for oocysts. The average number of oocysts per mid-gut was 189. No sporozoites were found in the salivary glands of any of the three lots, although some mosquitoes survived 15 or more days after the infective feeding. The temperature at that time of the year (April) may not have been sufficiently high to mature oocysts. Five A. punctipennis, all positive for oocysts, were dissected, but are omitted from the totals because none of them occurred in the pig-fed lot.

The results of this experiment indicate that engorgement with pig blood does not modify the subsequent avidity of A. crucians for human blood nor materially affect the susceptibility of that species for malaria parasites.

3. Attraction of Rabbits for Anopheles.

Legendre[2] states that rabbits are a preferred source of blood for Anopheles under certain conditions. During March and April we set a rabbit-baited mosquito trap 6 feet above ground in wood near a pig-baited trap, and later placed the same trap in a barn near a pond where many Anopheles were breeding. Some culicines were caught in the rabbit trap but not one anopheline, although numbers of A. crucians and A. punctipennis were caught in pig-baited traps and in barns in the immediate neighborhood of the rabbits. Under conditions obtaining in our tests, rabbits appeared to offer no strong attraction for Anopheles.

4. Domestic Animals as a Factor in the Production of Anopheles.

Our observations can not throw much light on the question as to whether the increased opportunity of getting blood afforded by domestic animals to mosquitoes leads to a measurable increase in the production of Anopheles of a region. Summing up the production of this species in some hundreds of breeding places or potential breeding places examined by us during the past three years, some 25 might be ranked at some period of the year, at least, as breeding places of the first order in terms of the number of anopheline larvae per unit of water surface. It happens that about 23 of these had domestic animals either confined or grazing at night within 500 yards or less of these breeding places. Of course, many places of low production could be found near barns or pastures as well as more remote from them. In practically all cases, however, domestic animals could be found within flight distance of the breeding places of Anopheles. Rice fields, swamps, and salt marshes little frequented by domestic animals except at their borders, often produce very large numbers of Anopheles. There are records of enormous production of anopheline mosquitoes in this country in areas little inhabited. While our observations have done little to elucidate this question, they leave us with the impression that the presence of suitable breeding water is the main determining factor in production of this species, and that the increase in numbers of domestic animals is not likely to make a difference of much weight in the number.

Discussion and Summary

Our observations indicate that of the Anopheles mosquitoes common in this country, A. quadrimaculatus and A. crucians, at least, show no special predilection for domestic animals over man when such factors as size and amount of exposure are excluded. The conditions which

[2] Legendre, J. C. R.: Acad. Sci. Paris, CLXX, No. 12, 1920, p. 766. Legendre, J., and Oliveau, A. C. R.: Acad. Sci. Paris, CLXXI, 1921, p. 822.

Roubaud describes as obtaining in France are not present in this country, at all events not in the Southern States. In the milder climate of these States many domestic animals roam at large in pastures night and day, summer and winter; stables are often of an airy construction and are rarely built immediately adjacent to human dwellings. Domestic animals may act as "buffers" in that they satisfy mosquitoes that otherwise might have fed on man, but there is little evidence that the Anopheles of this country have become zoophilic in the sense of Roubaud, or that they are likely to become so. It is questionable whether the increase in animal industry, apart from drainage and other concomitant improvements, has been a large factor in the decrease in malaria which has occurred in many parts of the United States. It is unlikely that a cordon of stables could afford much mosquito protection to dwellings, even if such a cordon could be maintained.

So far as the results of one experiment indicate, one would not expect that a feeding on a domestic animal would affect the subsequent susceptibility of Anopheles to malaria parasites. —**U. S. Public Health Reports** (Jan. 25, 1924.)

Items of Interest to the Practitioner

By A. T. Kinsley

An organism of the B. Welchi type and one of the colon group have been identified by Gaiger and Dalling as etiologic factors in a form of lamb dysentery.

Pasteurella oviseptica isolated from pneumonic lesions of lambs under slaughter house conditions by Spray were found to be pathogenic for mice, guinea pigs and rabbits. A non-virulent organism that was designated as "atypical bacillus ovisepticus" was also identified by Spray.

Scott has reported abortions in 18 cows which was apparently the result of salt poisoning, at least the serum test for infective abortion gave negative results in each of six of the cases that were subjected to the test.

According to some authorities, fowls are more sensitive to lead than any other animals. They are readily poisoned with practically any lead salt. One of the first symptoms of lead poisoning is the production of soft shell or shelless eggs.

Filth from the cow is the principal source of milk infection. Milk may also be contaminated from utensils that have not been properly cleansed. The milker may be a source of milk infection and so also may the air contain dust particles that carry infection.

In attempting to control an outbreak of an infective disease the apparently healthy animals should be removed from the infected lots, sheds and barns and the affected individuals should be left on the infected area, thus protecting the healthy animals and preventing the spread of the infection.

In a report from the Kentucky Experiment Station, it is shown that the number of pigs farrowed by Poland China sows is 10; Durocs, 9.2; Berkshire, 8.8.; and Hampshires, 8.7. According to this report sow pigs are slightly heavier when farrowed than boar pigs. It also shows a slightly larger number of females than males.

Arsenical poisoning is relatively common in live stock. Arsenic may be ingested in food or water or it may occur in animals as a result of dipping and absorption through the skin. Colicky pains, thirst and diarrhea are outstanding symptoms of arsenical poisoning, and the lesions in these cases consist of hemorrhages, congestion, inflammation and erosion in varying degrees in the digestive mucosa.

"One may, without hesitation, allow calves to be fed with naturally infected uncooked milk (from aborting cows) until they are six or seven months old without any danger that they will become chronic carriers of the disease, provided the calves are strong and healthy at the time of birth, feeding them with milk containing abortion bacilli has no bad influence on their general health."—J. Quinlan.

Iwanow reports an investigation in which it was demonstrated that salvarsan and neosalvarsan in 1:10000 dilution destroyed or at least rendered the Trypanasoma equiperdum uninfective in 15 minutes but did not appear to have any injurious influence upon sperm cells in two hours. Subjecting semen to these agents and resorting to artificial insemination, would be a means of controlling dourine. This same procedure may be of value in controlling bacterial infections of the genital organs.

Gastric ulcers in man or other animals are usually associated with, if not caused by, streptococcic infection. It is possible that there is some predisposing influence such as embolism that favors the infection. It would probably be possible to increase the resistance of the body by bacterins, vaccines, or anti-serum and thus diminish the incidence of ulcers, but it is doubtful if anti-streptococcic serum would be of value as a curative agent because of the diminished amount of blood in the ulcerated area due to obstructed circulation.

By a careful survey of several limited areas it has been found that the loss of baby chicks is enormous. It is probable that less than 50 per cent of the chicks hatched develop to maturity.

The county area tuberculosis eradication is progressing satisfactorily in 25 counties in Iowa. Sufficient funds are available in Iowa to carry this project to completion.

Dip solutions may be absorbed in eggs. Therefore, fowls should be dipped in the evening to protect the eggs. Eggs absorb sufficiently of some dips from recently treated hens to prevent hatching.

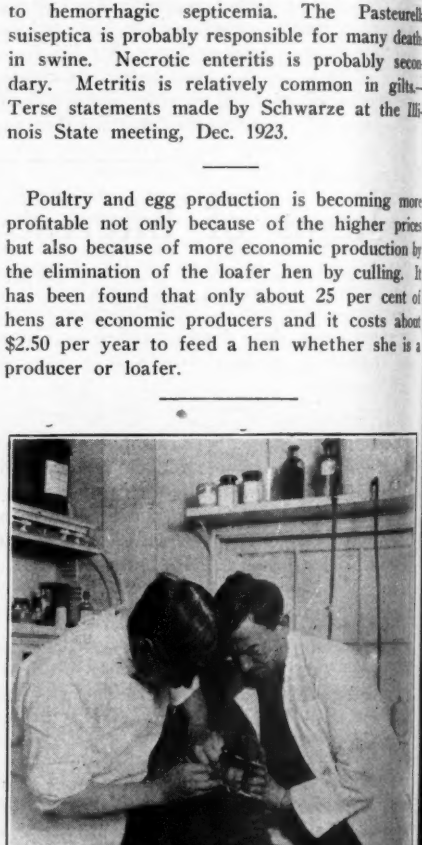
It may be possible to produce a flock of chickens that are immune or at least not seriously affected with B. pullorum by selecting and hatching eggs from hens that are B. pullorum carriers, and then properly feed and care for the chickens. —Ackerman.

The losses in swine immediately following medication with oil of chenopodium may be due to introduction of the drug into the respiratory tract or too rapid absorption from an empty stomach. Careful administration either with a stomach tube or dose syringe and the giving of a small quantity of slop just prior to treatment will reduce the losses to a minimum.

Profitable chicken production is dependent upon proper breeding, feeding and management. Green feed is essential and can be economically obtained by pasturing on blue grass. One acre of blue grass will supply sufficient green food for about 400 chickens.

Flu in swine is at least similar if not identical to hemorrhagic septicemia. The Pasteurella suiseptica is probably responsible for many deaths in swine. Necrotic enteritis is probably secondary. Metritis is relatively common in gilts.—Terse statements made by Schwarze at the Illinois State meeting, Dec. 1923.

Poultry and egg production is becoming more profitable not only because of the higher prices but also because of more economic production by the elimination of the loafer hen by culling. It has been found that only about 25 per cent of hens are economic producers and it costs about $2.50 per year to feed a hen whether she is a producer or loafer.



A dental operation at the Brooklyn, N. Y. Veterinary Hospital, conducted by Dr. R. A. McAuslin and his brother, Dr. David McAuslin.

Diseases of Calves and Their Serum Therapy*

Dr. J. Cernovsky-Ivanovice

Although calves are very susceptible to infectious diseases, nevertheless improper and deficient hygienic conditions are greatly responsible for the high percentage in calf mortality. Especially in the corners in which calves are frequently crowded and where manure and litter accumulate for weeks and months, many of the pathogenic organisms such as coli, paratyphous and necrosis bacilli find favorable media for their propagation. With the aid of bacteriology it becomes possible to differentiate the various disease complexes of calves into definite entities, some of which, however, may occur simultaneously or in succession in the same animal. For an effective specific vaccination an accurate bacteriological examination is essential; routine vaccination is valueless and often harmful. In large breeding establishments it is advisable to extend the period of calving preferably to May and June in order to eliminate the exposure from the greatly contaminated winter stable. It might also be advantageous to have the calves come over a longer period whereby the accumulation of calves and the contamination of the calf stable may be avoided.

Calf diseases may be divided into: (1) navel infections, (2) diarrhea and various enteritidis, (3) paratyphoid of calves, (4) hemorrhagic septicemia, (5) various forms of pneumonia, and (6) calf diphtheria.

Navel Infections

The navel infections run an acute (septicemia) or chronic (pyemia) course and are very often characterized by inflammatory or purulent processes of the navel. They are induced by coli, paratyphosus and bacteria of hemorrhagic septicemia and at times by streptococci and may become complicated with infections per os. The results of the bacteriological examinations even in the same herd, may therefore vary; in such cases, of course not much may be expected from biological therapy. Chronic navel infections are caused by the Bacillus necrophorus; sometimes also by the Bacillus pyogenes, coli, paratyphosus and cocci. The infection in such cases is characterized by a progressive necrosis of the navel region, thrombosis of the umbilical vein and embolic necrosis in the liver and lungs. Curative vaccinations have only rarely good effects. Proper measures in stable hygiene, cleanliness during parturition, treatment of the umbilicus and isolation of the calves in disinfected stalls or the application of a muzzle, are more effective procedures.

Calf Diarrhea

The infection occurs more frequently per os, rarely through the rectum. Diarrhea and weakness, in combination with navel infection are frequent manifestations. The infections are induced principally by coli and paratyphoid organisms (Poels and Jensen). The biological therapy should be specific. Coli bacteriemia runs a very acute fatal course in the first days of life. The infection develops exogen (from the outside world through suckling of the contaminated udder, through the litter, etc.) and endogen (through attainment of virulence of saprophytic intestinal bacteria as a result of devitalization of the body or of the intestinal mucous membrane.) Prior to the ingestion of colostral milk the stomach does not contain the bactericidal gastric secretions. The entering virulent bacteria pass the same undisturbed and attack the likewise unprotected intestines in which they readily penetrate the mucous membrane to enter the blood and the various organs.

Prophylaxis

Rational feeding of the mother animals, careful nursing of the newly born, strict cleanliness during parturition (disinfection of the stalls, the genital passages, the udder, the tail and the hands of the personnel), isolation of the mother with the suckling for a period of two weeks which should only then be placed in the common calf stables, proper stable temperature, and the early ingestion of colostral milk.

Protective vaccination: With the aid of strictly specific serum, injections as determined by bacteriological findings, the losses may be reduced from 100 per cent to zero (Jensen). For the purpose of an accurate determination of an etiological diagnosis, it is advisable to forward the carcasses of calves or organs (lungs, liver, spleen, kidneys and ligated portions of the digestive tract) to the state diag-

*From the State Diagnostic and Serotherapeutical Veterinary Institute of Czecho-Slovakia (Translated by A. Eichhorn).

nostic and serotherapeutical veterinary institutes. The serums are polyvalent in their action. The prophylactic dose is 15 cubic centimeters subcutaneously, the curative dose from 30 to 40 cubic centimeters subcutaneously or 5 to 20 cubic centimeters intravenously. The coli-white scours serum possesses an antitoxic and bacteriolytic action and besides increases phagocytosis. The same also applies to the infection caused by the bacterium lactis aerogenes.

(The author then describes briefly the nature of the diplococcus infections, also those induced by pyocyaneus, proteus and abortus germs. Also the diseases of unknown origin which are characterized by the sterility of the blood and of the organs and are probably caused by a purely toxic action of the coli bacilli which are not capable of propagation in the blood and the organs. In all these cases the administration of the serum against coli bacillosis is effective. In other cases which are induced through improper hygienic conditions the vaccination is useless. Finally in those instances where insufficient intestinal secretions are the causative factors pancreatic preparations are of value.)

Paratyphosus of Calves

Paracoli bacillosis, specific infectious enteritis of calves. The paratyphous bacteria which are very widely distributed in nature cause in calves diarrhea, pleuropneumonia and septicemia. In cows udder and intestinal inflammations, etc. Even with bacteriological methods it is not possible to distinguish those which are pathogenic for man from the non-pathogenic strains. The paratyphous bacteria of calves belong to the enteritis Gaertner group and cause in Holland, Denmark and Northern Germany a specific disease especially in the early months of the year. As a rule calves from three to six weeks old become affected. With vaccination it is possible to protect 70 per cent of the animals. (The author then describes in great detail the cause, the clinical and pathologic-anatomical signs, the period of incubation, the cultural and serological diagnosis of the disease, the differential diagnosis, the prophylaxis, sero-therapy and the principles of the meat inspection to be carried out in calves affected with paratyphosus.)

Hemorrhagic Septicemia Pasteurellosis

The condition is induced by many different strains of bipolar bacteria and affects young and older calves as well as yearlings, resulting from a navel wound, or per os infection. It is characterized by septic pleuropneumonia with manifestations of a serous and gelatinous infiltration of the subcutaneous tissues, hemorrhagic inflammation of the lymph glands, a degeneration of the organs and a fibrinous pleural exudate with hemorrhagic edematous infiltration of the interstitial tissues of the lungs with dark to blackish red foci in the pulmonary tissues, the latter being absent in acute cases of the disease. In chronic cases the affected parts of the lungs show necrotizing tendencies.

Aside from the septic pleuropneumonia and the "paratyphous pneumonia", various other forms of pneumonias are induced in calves. 1. By a small ovoid bacillus which, however, does not belong to the hemorrhagic septicemia group dark red hepatization of the anterior and lower portion of the lungs. 2. As a result of unknown causes with secondary invasions of the Bacillus pyogenes (pulmonary abscesses). 3. Pyogenes bacteria: extensive broncho-pneumonia with a tendency towards a necrotic-purulent degeneration. 4. Emboli: complication of navel infections and diphtheria. 5. Lung parasites: strongylides with secondary bacterial invasions. 6. Foreign body. Calf pneumonias, therefore, are not of uniform origin. Specific immune sera are effective against the bipolar organisms of the hemorrhagic septicemia group (vitalisepticus) against paratyphous bacilli; also against pyogenes infections. The specific action of the serum is dependent on the correct bacteriological establishment of the causative agent. Without such the immune sera cannot be uniformly effective.

Calf Diphtheria: (Bacillus Necrophorus Bang)

Necrotizing inflammation of the buccal mucous membrane, the esophagus, the trachea with diphtheritic pseudo-membranes; this disease is relatively infrequent and is of high mortality. The infection occurs through defects of the mucous membrane (breaking through of temporary teeth). Dyspnea, difficulty in taking food, the nasal openings are stuck together with secretions and brittle diphtheritic masses. At times necrotic foci with a purulent pleurisy develop in the lungs. The convalescing lasts for several weeks, the calves are in poor condition.

Differential diagnosis: The swelling of the mucous membrane in aphthous stomatitis or in foot-and-mouth disease is only moderate as compared with the cases of diphtheria and is covered with easily removable pseudo-membranes which in diphtheria are of several centimeters thickness and strongly adhere to the markedly inflamed mucous membrane.

Differential Diagnosis of Anthrax and Hemorrhagic Septicemia

By C. C. Lipp, South Dakota State College, Brookings, S. Dak.

ANTHRAX

History

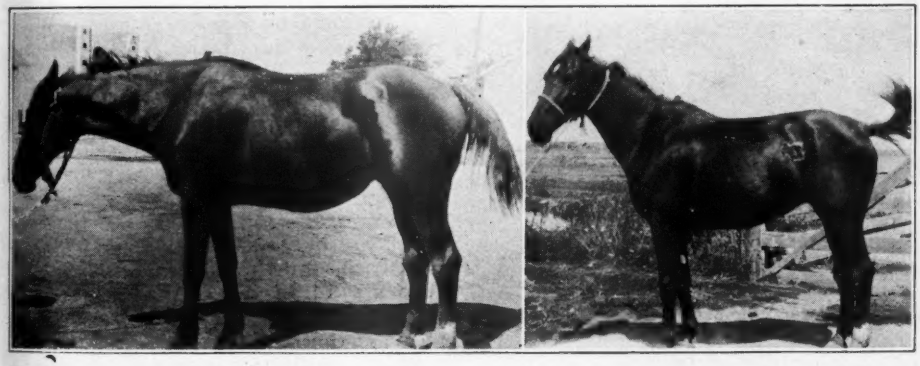
Anthrax is one of the oldest diseases known. Fairly complete descriptions of it appear in the literature dating back many hundreds of years before Christ. It is widely distributed, appearing in many parts of the civilized world. In the United States it occurs most frequently in the Missouri and Mississippi valleys, on the Atlantic and Gulf coastal plains and in California.

Incubation Period

The incubation period is always short, and since the symptoms are of a fulminating nature, the beginning of the disease is rarely observed. As a rule from twelve to thirty-six hours after infection occurs, the animal is moribund. Prodromal symptoms are lacking. Death is the usual outcome, but occasional recoveries have been noted.

Susceptible Animals

All of the larger species of farm animals are susceptible to anthrax infection, but not equally so. Sheep are most susceptible and swine least so. Man contracts the disease in whom it assumes the pustular type nearly always, because infection is through skin wounds. Animals always develop the septicemic type because infection is via the digestive tract.



The picture on the left shows a horse with anthrax. The edema and swelling are clearly shown. The second picture shows the animal after recovery.

Cause

Anthrax is caused by the anthrax bacillus. It is aerobic and sporulates freely in the presence of air. When kept from the air, the bacilli do not sporulate, or do so slowly and with difficulty. The bacilli are not difficult to destroy, but the spores are very resistant to destruction. These two facts; namely, the ready sporulation, and the high resistance of the spores account, in large part at least, for the prolonged infection of pastures and range districts. Low swampy pastures and hot summer weather, following a period of drought favor the development of anthrax, although it does occur less extensively under other conditions.

Symptoms

On account of the rapid development of anthrax, symptoms are rarely observed. It is quite usual for an animal to be found dead that but a few hours beforehand showed no evidence whatever of the presence of disease of any kind. When to these facts is added the further facts that anthrax is a pasture disease and animals attacked are frequently not under the owner's daily observation, the spread of

the disease, and the loss incident to it are more readily explained. Among the most noted symptoms the following may be mentioned. There is a high fever of rapid development. When such animal is forced to move, it does so with extreme effort. There is frequently a blood-tinged discharge from the nose, anus, and the genital openings.

Lesions

Before making an autopsy a complete history should be secured. If the death was sudden, occurred during the anthrax season, and in an area known to be anthrax-infected, especial precautions must be taken to protect the person making the autopsy, and to prevent the distribution of infectious material, or its escape into the soil.

The first post mortem characteristic of anthrax is rapid putrefaction, due to the rapid development of putrefactive bacteria in the tissues. The second post mortem characteristic is the enormous distention of the carcass with gas. This is, of course, incident to the putrefactive process. Anthrax blood is usually thicker than normal blood, much darker in color, coagulates but slightly, if at all, and dries with a varnish-like gloss. The spleen is always enlarged, sometimes to many times its normal size. The spleen pulp becomes almost black in color, and breaks down into a pultaceous mass that may be poured from the capsule when one end of it is incised. There is also a larger than normal, although variable quantity of blood-tinged serum in both thoracic and abdominal cavities. Finally, subcutaneous swellings are frequent in the region of the dewlap and along the under line of the body. Section of these swellings shows the tissues to be filled with a yellowish gelatinous fluid.

Bacillus anthracis

Laboratory Diagnosis

Many times recourse must be had to laboratory service in order to establish the diagnosis beyond all doubt. Such service includes a microscopic and bacteriologic examination of material submitted, and as a rule the inoculation of one or more suitable laboratory test animals. A laboratory diagnosis is disappointing when the disease runs a peracute course, or when the material for examination was secured twenty-four hours or more after death. In the former case, anthrax bacilli are few in number, and in the latter case they were destroyed by putrefactive processes.

Differential Diagnosis

The following diseases present some of the characteristics of anthrax, but distinguishing features are well enough developed to permit a differential diagnosis in most cases. So-called cornstalk disease causes sudden death without symptoms. The animals die in the stalk fields or soon after having been in them. The lesions of hemorrhagic septicemia predominate and the history and surrounding circumstances are not those that lead to a suspicion of anthrax. This, however, must not be interpreted as a statement that anthrax cannot appear under such surroundings. Blackleg is another disease that may confuse the diagnostician. The age of the animal and the presence of the gas-filled blackleg tumor assist in determining the true nature of this disease. It is granted, of course, that autopsies are sometimes held in which the lesions are not typical of either anthrax or blackleg. In such cases diagnostic information can only be secured by laboratory examination. In passing it is well to note that blackleg organisms are present in the blackleg tumor. Their detection in blood from other parts of the body is difficult. Malignant edema may also be mistaken for anthrax, but it is oftener confused with blackleg.

HEMORRHAGIC SEPTICEMIA

History

Hemorrhagic septicemia is a comparatively new disease. It made its first appearance in Europe about fifty years ago, and spread since then to many parts of the old world. The first record of its appearance in the United States was about twenty-five years ago. Since that time it spread to many parts of the United States, at present it claims a considerable toll of animal lives annually.

Cause

The bacillus causing hemorrhagic septicemia in cattle belongs to a family of bacteria known as the hemorrhagic septicemia family. The members of this family are specific in their pathogenic properties, each for a distinct species. Present information indicates that this pathogenicity is not interchangeable, and that bovisepticus attacks cattle only. Another interesting feature about this organism is the fact that many apparently healthy cattle harbor the living hemorrhagic septicemia organisms, which are only held in suppression by the animals' natural means of protection against the development of bacterial disease. As soon as the animals' vitality is reduced by any means, the bovisepticus organisms present multiply rapidly, enter the blood stream and produce fatal results. The further fact is also important; namely, that most cattle yards, feed lots and stock yards are permanently infected with these organisms, the two former with a slightly avirulent type, and the latter with a highly virulent type.

Avenue of Infection

Hemorrhagic septicemia infection occurs via the respiration passages or the digestive tract. These organisms show a predilection for certain organs like lungs, digestive tract or brain, and the disease usually assumes the pulmonary, intestinal, or cerebral type. The period of incubation, like in anthrax is short, lasting from but several hours to several days after conditions favorable for its development are established. Hemorrhagic septicemia is more prevalent during fall and winter, and such loss may occur in the feed lot or stalk field. It is not as distinctly a pasture disease as anthrax is.

Symptoms

The symptoms of the pulmonary type are those of a severe pneumonia. In the intestinal type there are evidences of digestive trouble. In the cerebral type the animal goes crazy, so to speak, runs in circles, bawls, butts into fences and walls, climbs into mangers, and does other stunts that indicate the presence of a cerebral disturbance. As a matter of fact the disease in all its types tends to appear in a peracute or acute form and it is, therefore, impossible to study symptoms carefully.

Lesions

The post morten appearances are quite characteristic. The predominating lesion is the presence of hemorrhages varying in size from a pin head to that of a pea, and occasionally to the size of a dime. These hemorrhages are present under the skin, in the muscles, on the lungs, on the heart surface and beneath the lining of its chambers, on the surface of the digestive organs, in the bladder and even sometimes in the joint surfaces, especially of the legs. Putrefaction does not occur rapidly as it does in anthrax. Neither is there such a rapid development of gas and consequent bloating. The blood is normal in color and consistency so far as the unaided eye can detect. The spleen is not enlarged or softened, and there is no tendency for the collection of a blood-tinged serous exudate in either the thoracic or abdominal cavity. There are no subcutaneous swellings or gelatinous exudates as in anthrax.

Laboratory Diagnosis

It is often necessary to have a laboratory diagnosis made before a field diagnosis is possible. A blood sample furnishes the needed material for examination. A microscopic and a bacteriologic examination can be made and finally laboratory test animals may be inoculated. The results of laboratory examinations are satisfactory when interpreted in the light of the complete history of the case, its symptoms and post morten lesions. When not so interpreted, the diagnosis may be faulty, leading to faulty advice, future loss of animals, and loss of confidence in the veterinarian.

Two diagnostic pitfalls must always be guarded against by the laboratory worker. In the first place a laboratory examination of blood will not disclose the nature of the predisposing cause. In the second place, when animal inoculation is resorted to the fact must be borne in mind that one type of bovisepticus bacilli fatal to cattle has no pathogenic effect on laboratory test animals.

Differential Diagnosis

If the important diagnostic features of anthrax and hemorrhagic septicemia are placed in parallel columns for comparative study, the following facts stand out clearly:

1. Both diseases assume either the peracute or acute type as a rule, and prodromal symptoms are lacking.

2. Anthrax is a pasture disease most prevalent from midsummer to the beginning of winter.

Hemorrhagic septicemia may appear in the pasture or feed lot, and consequently at any season of the year.

3. Anthrax blood is black and tarry, and shows but slight tendency to clot.

Hemorrhagic septicemia blood is normal in color and consistency and clots readily.

4. An anthrax spleen is enlarged and its pulp dark in color and semifluid in consistency.

The hemorrhagic septicemia spleen is not enlarged and its pulp is not discolored or liquefied.

5. Anthrax carcasses contain an abnormally large quantity of blood-tinted serum in both thoracic and abdominal cavities.

Hemorrhagic septicemia carcasses contain fluid in thoracic and abdominal cavities that is normal in both quantity and color.

6. Subcutaneous infiltration with a slightly yellow gelatinous fluid is a common post mortem finding in anthrax.

In hemorrhagic septicemia no such infiltration occurs.

7. In anthrax the subcutaneous, subserous and various other locations contain well circumscribed hemorrhages ecchymotic in nature.

In hemorrhagic septicemia there are also numerous hemorrhages scattered through the body which are petechial in nature, and less darkly colored than the anthrax hemorrhages.

8. Finally, in anthrax the liver, kidneys and many lymph nodes connected with the visceral organs are enlarged, congested, infiltrated with a gelatinous exudate and ecchymotic.

In hemorrhagic septicemia there is no such enlargement or congestion, the gelatinous exudate is absent and the hemorrhages are petechial rather than ecchymotic.

Delayed pubescence, shortened period of sexual activity, reduced fecundity and increased sterility are induced by a restricted diet. It has been demonstrated that the line of descent will become extinct in experimental animals in the third generation by Slonager and Card. —(Am. Jr. of Jhys.)

According to Dr. Henry C. Sherman, Professor of Chemistry of Foods of Columbia University, children should consume one quart of milk each day. Dr. Sherman is an authority on food problems and no doubt the vital statistics would soon reflect the wisdom of the milk drinking program suggested.

Dr. H. K. Miller and his assistant, Dr. Otto Ruehle, of New York City, treating a dog that sustained an injured eye following an encounter with a cat.

Abstracts of Foreign Literature

By A. Eichhorn

Sepsis in Pigs as a Result of Infection of the Umbilical Vessels

The infection of the umbilical vessels in pigs is of a polybacterial nature. Aside from coli bacteria frequently streptococci, diploccoci and in one instance paratyphous bacteria were found. The course is subacute to chronic. Symptoms: Variable, crustaceous eczema which extends over the entire body, lameness as a result of arthritis tendinitis, fibrinous-purulent pericarditis, hemorrhages into the pericardium and anemia. In chronic cases the bacteria as well as their toxins exert especially the pathogenic action upon some of the organs (blood, skin, joints, tendons). The mode of infection is intra- and extra-uterine. Although the clinical manifestations are remarkably varied and the pathologic-anatomical picture may show extraordinary changes, nevertheless there is a similarity with pyoseptic-emia of colts; this condition, however, should not be confused with scours in pigs. Therapy: Injection of the mother's blood together with vaccine. The vaccine therapy alone proved not as effective.

Dr. A. Eichhorn

Thousands of pigs die as a result of this infection without the recognition of the cause of the disease. In cases of intragenital infection the vaccination of the young animals should be undertaken immediately after birth and on infected premises the vaccination of the mother of the sows before parturition is also indicated. In chronic cases, aside from the vaccination, the animals should be well fed, kept out in the fresh air and sun.—Sachweh and Reinstorf—(Tier. Rund. Vol. 29, No. 17).

Protective Vaccination Against Rabies in Domestic Animals

The author reports his own experiment and also those which were partly carried out with Kliem and Kapfberger; likewise the experiments of Pfeiler, Pokschischewsky, Schnurer, Mueller and Munzberg. In order to make better use of the fixed virus of rabbits, Miessner employed aside from the spinal cord also the brain; through quick drying at low temperatures in a special apparatus he succeeded in producing a preparation (lyssin) which retained its pathogenic action for one month. The experiments with this product have not yet been concluded. Miessner however, recommends the prophylactic intra-abdominal vaccination with large doses of fixed virus, which are harmless and which on experimental work proved to confer protection against the subsequent not too severe infection with street virus. Inasmuch as the authoritative measures for the control of rabies have not proved effective in Germany, Miessner considers the obligatory vaccination of all dogs in the threatened zone as a commendable measure and in this connection he advises that the inaugurated experiments with lyssin should be continued. Instead of rabbits, he is of the opinion that dogs should be utilized for the production of the fixed virus used for the preparation of vaccine. The vaccines employed were produced from the brain and spinal cord of dogs which proved more satisfactory for the production of vaccines than material from rabbits. The author refers to the experimental work of Eichhorn and Lyon who have successfully immunized dogs with single injections of large dozes of carbolized fixed virus against considerable quantities of street virus.—Professor H. Miessner, (Dut. Tier. Woch., Vol. 31, No. 17).

Experiments with Feeding Tuberculous Material from Man and Cattle to Chickens and Pigeons

The author conducted extensive experiments on the possibility of transmission of human and bovine tubercle bacilli to chickens. His experiments were limited to feeding as he aimed to follow the usual methods of infection as occur in nature. All feeding tests with tubercle bacilli, those of the human type as well as those of the bovine type, gave negative results although great quantities of human sputum con-

taining tubercle bacilli and tuberculous organs from test animals were fed. The control experiments which were undertaken with pure cultures of the avian type gave positive results not only on subcutaneous administration but also when given per os.—Dr. Kurt Ischernitz Inaug. Dessert., Dresden, 1923.

Investigation of Distemper Pneumonia

The investigations were undertaken on 33 dogs of which 26 were affected with the pneumonic form of distemper. The examination of the lungs of these 26 for bacteria failed to give uniform results. Most frequently streptococci and staphylococci were found. In some cases and mostly in association with streptococci and staphloycocci other rods were also present. In three of the cases the examination failed to reveal any bacteria whatever. On the other hand, in all distemper cases which were examined cellular enclosures were found in the conjunctiva as well as in the lungs. These enclosed granules of the cells were of bright red color and of a form as described by various authors; their presence were established in all of the twenty-six cases following the method of staining of Maan. Following the Lentz method of staining the enclosures appeared bluish red. In the epithelia of the conjunctiva they were present only sparingly, but they appeared more numerously in the sections of the lungs, especially in the lining epithelial cells of the more or less intact bronchi. In six tuberculous and old dogs which were examined for comparative purposes, no such cellular enclosures were found.—R. Baumann, Wiener Tier, Mon., 1923, No. 8.

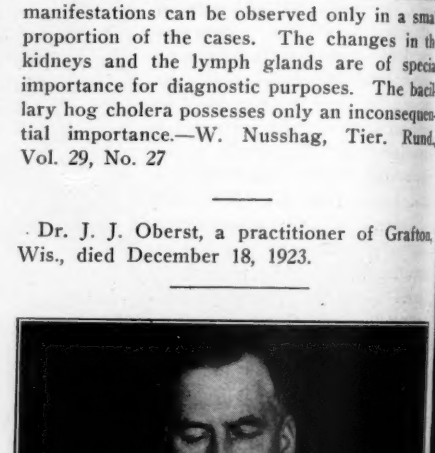
The Treatment of Canine Distemper With Borax

Guedens has successfully treated many cases of the nervous form of dog distemper with borax together with potassium tartrate. He recommends two to five grams daily depending on the size of the dog, divided into three parts and to be given morning, noon and night. In association with this he administers the usual serum treatment.—G. Geudens, L'Echo Veterinaria, August, 1923.

The Diagnosis of Hog Cholera

The author discusses the clinical and pathologic-anatomical signs of the "true pure hog cholera". That is the disease which is caused by the filtrable virus. He states that in Germany as well as in the other countries hog cholera occurs as a hemorrhagic septicemia in 90 per cent of the cases. The virus appears primarily to exert a harmful effect on the blood vessels, especially in rendering the finer blood vessels more pervious. The hemorrhagic and hemorrhagic fibrinous manifestations stand, therefore, in the foreground in pure hog cholera, whereas the diphtheroid (necrotizing processes) occur only secondarily. The changes in the large intestines commence with the hemorrhagic enteritis and only in the later stages develop the necrosis. The necrotic foci which have been heretofore considered as classical manifestations can be observed only in a small proportion of the cases. The changes in the kidneys and the lymph glands are of special importance for diagnostic purposes. The bacillary hog cholera possesses only an inconsequential importance.—W. Nusshag, Tier. Rund, Vol. 29, No. 27

Dr. J. J. Oberst, a practitioner of Grafton, Wis., died December 18, 1923.



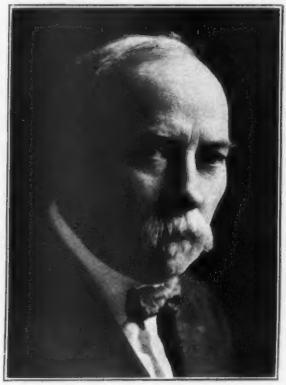
Dr. Bruce Blair of New York City with one of his canine patients

Poisonous Plants

By L. H. PAMMEL

SUPERSENSITIVENESS TO THE CASTOR OIL BEAN

Professor William J. Robbins of the University of Missouri in a recent number of Science published an interesting account (N. S.-8: 305) of supersensitiveness to the castor oil bean which reminded me of a similar case that came to my notice in my laboratory some years ago. I am appending a statement from the lady, Miss C, in regard to its action. Dr. Robbins in his article says:



Prof. L. H. Pammel

"The subject, Miss K. while taking the laboratory work in botany as a student developed a severe case of what appeared to be hay fever. It was apparently associated with something used in the laboratory. Not until a year later when she acted as an assistant in the same course was the castor bean found to be the cause.

"The attacks were initiated with severe sneezing and some headache and general discomfort a few minutes after exposure. Her face became inflamed and puffy, eyes reddened and swelled, breathing was accompanied by a wheezy sensation. The mucous membranes were decidedly irritated and later cracked. The surface of the cornea of the eyes in some cases became slightly wrinkled. After the heaviest attack Miss K. was confined to her bed for three days and the after-effect lasted for two weeks.

"It was not necessary for her to handle the castor beans but merely to be in the room where they were dissected. In fact, in one instance a few beans were used in the laboratory in the morning from 10 to 12 when Miss K. was not present and was not aware of their being used. A few minutes after she came into the laboratory in the afternoon at one, typical symptoms with sneezing and headache developed.

"The castor bean plant had an effect similar to that of the bean. Within a few minutes after cutting the leaves and stems of a castor bean plant for histological purposes, Miss K. suffered from a mild but typical attack.

"Out of several hundred students, the case mentioned is the only one of its type I have observed. It was noted, however, that one of the instructors suffered from a badly inflamed eye due to rubbing it with his fingers after dissecting some castor beans."

The lady who was poisoned has given me the following interesting history. "Several years ago I was severely poisoned by castor beans although up until that time they had never seemed to affect me seriously. We had never grown them as ornamental plants and that autumn (1904) we moved to Ames and purchased a home where a great many of them were growing. In gathering the seeds before winter I had tied them up in an old handkerchief. We played toss with the ball so formed for several minutes before entering the house. They were put into a jar and I failed to discard the handkerchief. At dinner it still remained in my pocket—something funny happened and without thinking, I wiped the tears out of my eyes while laughing. In less than ten minutes my eyes were paining me dreadfully; also my nose and throat. I found in a short time that I could no longer see, and my eyeballs were each one big blister. This condition lasted for several hours, even after continuous bathing. The irritation lasted for several days and was very much like a severe hay fever. I have never been able to touch castor beans since that time or even come very close to where they were being handled without the recurrence of these symptoms."

HAY FEVER PRODUCED BY MARSH ELDER OR CATTLE WEED

I am sending you under separate cover a weed for identification. This weed has been the cause of developing several cases of hay fever. We are anxious to have it identified as the parties having the hay fever wish to secure serum that will counteract it.—F. F. C.

Reply: The specimen sent is marsh elder, cattle weed or halfbreed weed (*Iva xanthiifolia*), This weed is native to the west—western Minnesota, to Colorado and now widely naturalized

eastward across Wisconsin and Illinois. This weed is related to ragweed and is one of the wind pollinated plants and like ragweed causes hay fever. I was greatly interested recently in observing that this plant was very common along irrigation ditches in western Nebraska and eastern Colorado and in corn fields of western Iowa. There is no question that it is a frequent cause of hay fever in the region where it occurs.

THREE SEEDED MERCURY FROM OKLAHOMA

Dr. C. C. Nickel of Nowata, Oklahoma, sends a specimen of three seeded mercury (*Acalypha ostraefolia*) to me and the following letter:

"I am sending you a sample of plant which is suspected of being poisonous to horses. I am not familiar with this plant and it seems to grow as a pest on a small plot of tilled soil. It was not to be found anywhere else on the premises. The plot where it is found has been used as a garden spot which was later plowed up and sowed to wheat. The horses were turned out on this wheat pasture. The tops of the plants show plainly that the horses have eaten considerable of them. The man claims to have lost horses after being turned out on this particular plot of ground for the past three or four years. He has lost two during previous years, one this year before frost and during this past week had two more taken down, (after frost). He has also had a number showing similar symptoms during this period after they were turned on this plot. The plant seems only to be found on cultivated soil.

"Horse No. 1: Bay gelding, 9 yrs. old, wt. 1100 lbs. Called to see this horse Friday, Oct. 26th. Apparently slightly uneasy at times. Respiration, pulse and peristalsis normal. Feces coated with a brownish mucus (slightly). Urine extremely dark, darker than commonly found in azoturia and also very thick. Mucous membranes a very dirty icterus. Temperature and otherwise apparently normal. Medication —aloin physic, hepatica and renal stimulant and antiseptic. Called on Saturday, Oct. 27th to see horse No. 2 that became affected. Horse No. 1 showed some improvement.

"Horse No. 2, black mare, 3 years old, wt. 950 lbs. Symptoms identical with those of No. 1 except pulse which was normal in character but pulsations were 85. Urine, feces and mucous membranes about the same as those of No. 1, treatment same as No. 1."

The three seeded mercury belongs to the spurge family which contains a number of poisonous plants like castor oil bean, croton and spurge. I listed three seeded mercury as poisonous largely because several persons sent it to me with the reports that it was poisonous. Several species are reported as emetics.

TALL CONE FLOWER SUSPECTED

Mr. Homer M. Price, of Glidden, sends a specimen and writes as follows: "A farmer friend brought this weed in and blamed the death of several hogs to it." The plant received proves to be the tall coneflower (*Rudbeckia laciniata*). This member of the sunflower family is the original of the golden glow and is related to nigger head. It is a smooth perennial with yellow heads and a smooth stem. It grows in low grounds. The tall coneflower has been suspected several times as being responsible for the death of cattle. I have published several articles on it in VETERINARY MEDICINE. The plant is widely distributed from eastern Canada to Florida, Manitoba and Montana and New Mexico.

After writing the above about this plant I received the following letter and a specimen of the same plant from Dr. R. A. Crider:

"I am mailing today some plant specimens, which we suspect caused poisoning to hogs. Of the specimens the largest plant predominated in the place the animals rooted. The owner states he has had hogs poisoned on this pasture for several years, has had no loss but animals were very sick. He also states that animals which had been ringed previous years were not affected, showing the hogs must obtain the poison from the roots. Symptoms similar to blind staggers; labored breathing, salivation, temperature about normal, animal hardly able to stand alone."

This description is not unlike the other accounts I have had concerning the plant. It is likely the young plants and roots are more injurious than the older plants.

In this same connection Dr. J. A. Brill of Dow City, Iowa, sends three specimens; one a kind of water leaf *Ellisia*, a dropseed grass and wood sage. None of these plants, so far as I know, are poisonous. I know nothing of the waterleaf, although it might be suspected. Dr. Brill writes as follows:

"In addition to these plants there was wild hemp and some sunflowers present. The hogs

have access to the alfalfa field which is devoid of any weeds. But on the north side of the field next to the fence is where the weeds are and the hogs have been rooting them up and eating them. Eight hogs got stiff behind and showed inco-ordination of the hind quarters, but there were no losses. This year one hog died; several have been sick but have recovered. At present one is sick showing paralysis of the throat and is unable to swallow."

I suppose the plant referred to here as "sun flower" may be the same as described above and if so, very likely caused the trouble referred to by Dr. Brill.

POISONOUS AMANITA

W. Neuhoff in a paper on poisonous fungi (Die Pilze, 1922: 50), gives some interesting data on the number of poisonous fungi formerly and now recognized. Not so many years ago it was thought that the majority of these fleshy fungi called toadstools and mushrooms were poisonous. More than 100 years ago Persoon (1819) published an illustrated volume on edible and poisonous fungi with some interesting facts. Fries, the greatest of the older authorities on fleshy fungi, on the basis of some investigation on animals, is recorded. The Hallimasch (*Agaricus melleus*) according to some investigation is poisonous. It has however been eaten many times since without any injurious effects and yet a few years ago at one of the meetings of botanical seminars at Ames where this fungus was eaten it caused a general poisoning of at least a half dozen persons. They took sick soon afterwards, becoming dizzy and were seized with vomiting. Others were not affected.

To continue, Neuhoff states that about 30 years ago mycologists began to estimate that only about six species of fleshy fungi were actually poisonous. It should be said further that only about 10 per cent of the species have been tested as to poisonous qualities. Of the 500 species now recognized only 20 are considered poisonous. The most poisonous one is the death cup (*Amanita phalloides*). Many cases of poisoning due to fungi seem to be traceable to this fungus. The author goes on to say that every poisonous fungus produces a typical clinical symptom.

The yellow amanita (*Amanita mappa*) was formerly regarded as a very poisonous fungus 50 to 100 grams of the fungus causing death. In recent years some persons have eaten the fungus without injury. The author thinks perhaps that soil or weather conditions may influence its poisonous action. When poisonous the effect is similar to the common death cup (*Amanita phalloides*). The fly agaric belongs to the same category. During the recent world war it was often eaten by the Russians. The symptoms of poisoning came on rapidly in some cases fifteen minutes after the fungus was consumed; cramps, vomiting, dizziness, dimness of vision occurred followed by loss of consciousness. The brownish panther fungus (*Amanita pantherina*) is now also recognized as poisonous although formerly regarded as edible.

The author describes several other species of poisonous fungi and mentions quite a number of others which may be poisonous at times, especially to some persons. The author mentions several fungi which in some persons produce dermatitis like strawberries and nettles. This Journal contains other interesting articles on poisonous fungi by Dittrich, Sabalitschke, Leidig and Hester.

REPORTS SHOW ONE-THIRD OF YOUNG PIGS DIE

That about one-third of pigs farrowed in the spring die before weaning time, is shown by reports from representative farms in four Corn Belt States. A summary previously issued by the United States Department of Agriculture showed an average loss of more than 35 per cent, on 168 farms in Indiana, Illinois, and Iowa, of 18,837 pigs farrowed in the spring.

Additional information on this subject was recently furnished the department by H. G. Zavoral, livestock specialist of the Minnesota University extension service. The Minnesota survey covered 363 farms. Of 27,412 pigs farrowed on these farms in the spring of 1923, a total of 9,300 were dead before weaning time. This loss of 34 per cent compares closely with a loss of 33 per cent in that state the preceding year, and also with the percentage for the other states.

The chilling of young pigs can be largely prevented by proper housing at farrowing time. Those crushed by being laid on by the sow could have been saved in many cases by the use of guard rails around the sides of the farrowing pen to prevent the sow from lying against the wall. The farrowing of weak or dead pigs is preventable in a large degree by the use of vigorous breeding stock and proper care and feed given the sow before the pigs are born. Detailed information on swine management and method of reducing the losses mentioned, may be obtained without charge from the Department of Agriculture, Washington, D. C., as long as the supply lasts.

DEMAND FOR SPAYED HEIFERS

There is an increasing demand for spayed heifers. This demand is largely the result of area tuberculosis eradication. In this, as in all other commodities, there will be a supply to satisfy the demand. Speculators and dealers are casting about to determine ways and means of supplying spayed heifers. In one of the largest markets, arrangements are being completed for the spaying of several carloads of heifers. These heifers will then be shipped to a country feed lot and will be ready for market as soon as the operative wound has healed. The operation will be done by veterinarians because a certificate will, no doubt, be required by the sanitary authorities before permitting spayed heifers to be shipped into modified accredited areas.

The loss from spaying should not be large and if the spaying is done on a large scale the cost of the operation will, no doubt, be about the same as the cost for tuberculin testing.

Some questions have arisen in this problem that require surgical knowledge. What operation will be most practical on heifers ranging in age from six months to two years? Will the operation produce abortion in pregnant heifers? Will abortion induced by spaying result in metritis or other serious complications? Will it be practical to spay heifers in carlots and ship the same day?

VETERINARY MEDICINE will be pleased to publish answers to the above questions.—A. T. K.

TWO CASES OF PNEUMONIA IN COWS

On November 11th I was called to see a pure-bred Guernsey cow, valued at $1000. I found her with all the symptoms of pneumonia; temperature 107; pulse 110, respiration 50; elbows out; rales in throat; tender between the ribs. I was sure it was a case of pneumonia and treated it as such; blanketed well, put in quarantine, gave stimulants and internal antiseptics such as sulpho-carbolates in 50 grain doses, and put on a good mustard plaster. The temperature remained between 105 and 107; pulse up around a hundred, and respiration up and down from 30 to 50. I tried giving camphor in oil every day for four days, but there was no improvement in the heart. I then put the patient on nux, gentian, acetanilid and alcohol, with no better results. This cow was a poor doer, as I would call it, and was not a good feeder even when in apparently good health and had eaten very little since sick.

On December 12th another cow came down in the same way and seemed to be going the same route, with high temperature, pulse and respiration very fast, and the same symptoms as the other patient. This cow stood across from where the first one stood and was a dry cow due to freshen in about a month. It seemed unusual for a cow to go with pneumonia 37 days as was the case with the first one, and I wrote to Dr. Merillat for his opinion. He asked if I was sure the cow was not tuberculous.

Both of these cows were from an accredited herd and had been tested in November. Finally the first cow became in such condition that I advised destruction, informing the owner that the animal must have some lesion of the lungs that I was unable to clear up. On December 20th I destroyed the cow and found the right lung and the left also half full of abscesses; in fact, the right lung was over half gone and only the upper part of the left was clear. To have let the animal live a few days longer would only have prolonged her misery.

The other cow made a good recovery, later giving birth to a nice heifer calf, and is now doing well.

Grand Rapids, Minn. D. R. Burgess.

TUBERCULOSIS ERADICATION

The annual report of the Tuberculosis Eradication Division for the past fiscal year indicates that approximately one out of every nine premises in the United States upon which cattle are maintained was found to harbor tuberculous animals. The lowest record for any one State was about one per cent while the highest percentage ran about 47 per cent. This number of infected premises would indicate the necessity for the testing of all cattle before any assurance is possible that the disease can be controlled and eventually eradicated.

Cattle Tested During 1923

A study of data available indicates that five states tested over 200,000 head of cattle each during the past fiscal year, Wisconsin leading with approximately 231,000, followed by Michigan with 274,000, New York with 253,000, Missouri with 219,000, and Iowa with about 214,000.

Care in Application of Intradermic Test

The advantage of using a cleansing agent such as denatured alcohol, and the exercising of extreme care in applying the intradermic test is clearly reflected in the following extract taken from a letter directed to the Bureau by an individual of national prominence:

"I have a letter from my tenant who says it is about a year since his herd was tuberculin tested. He does not remember the name of the expert who tested the herd last, but he would like to have the same man, if possible. He writes,

'I wish you would try and get the same man we had last year. He was very careful with his needle. On several occasions other parties did not disinfect the needle, and some broke the needle off. The last man was very careful, and did the work nicely.'"

Necessity for Testing Calves

In connection with the questions given in the examination, accredited men are advised that it is deemed advisable to tuberculin test all calves in herds regardless of age, whenever the intradermic or ophthalmic tests are being used. Numerous cases have been reported indicating that the disease has been found in very young animals, hence the necessity for the tuberculin test.

Another Examination Question

Another question given in recent examinations related to the definition of what constituted a "spreader" of tuberculosis. Many indefinite answers were given. Briefly, a "spreader" of tuberculosis is an animal sufficiently infected with tuberculosis in an active stage, which is excreting from any bodily opening such as the bowels or milk ducts or expelling by coughing, living tubercle organisms. A "spreader" is not necessarily one which has failed to react to the tuberculin test. Means of detecting spreaders are by the use of the various tuberculin tests and the combinations thereof, by physical examination, and by laboratory examination of suspected excretions and animal inoculation of the same.—B. A. I. "Side-Lights on Tuberculosis Eradication."

METHOD FOR CONCENTRATION OF PARASITE OVA IN FECES

1. Add water to fecal sample until liquid.

2. Coarse particles may be removed by straining through wire netting.

3. Fill a stout walled test tube (4 in. by ½ in. diam.) or a centrifuge tube (15 mil.) about one-third full of well agitated fecal mixture.

4. Add an equal amount of the following solution:

Sugar 1 lb.
Water 12 oz.
Dissolved by immersion in hot water.

5. Mix by inverting tube several times.

6. Either allow tube to stand 12 to 24 hours or centrifuge about 2 minutes at 1500 to 2000 revolutions per minute.

7. Remove tube from centrifuge without shaking.

8. Lift off surface layer of tube by means of a prepared glass rod (a six inch length of 5 mm. glass rod is heated to redness at one end and "headed" against a solid surface while soft).

9. Transfer drop from the glass rod to a microscope slide by gently rotating the rod on the slide.

10. Carefully lower a coverslip on the drop and search systematically for ova under low and high power of the microscope.

11. Glass rods and tubes should be rinsed in order to avoid contamination of specimens examined later.

Reference: Sheather: The Detection of Worm Eggs in the Feces of Animals: *Journ. Comparative Pathology and Therapeutics,* Vol. 36, June 1923, pages 71 to 90.—Dept. of Veterinary Pathology Iowa State College.

IDENTIFYING OWNERSHIP OF STEER

I should like some information that would help to decide the ownership of a young steer that was away in pasture all summer and is now claimed by two men. The steer carries no identification marks except dehorning scars. One claimant dehorns with caustic and the scars on this steer correspond with the scars on his cattle, except that both scars on this steer are uniform, and on his cattle there is a little variation in the scars on either side of the head. The scars are flexible and movable in the skin.

The other claimant dehorns with dehorners and says this calf was dehorned at four months of age, which might account for the flattened shape of the scars. No stump of horn is left and the scar pares off easily with a penknife, which I think it would not do if the scar was horn.

Would the blood of this steer show an affinity for the blood of its mother? If blood samples were taken from this steer and from the cow which each claimant says is its mother, could one determine its parentage? Could blood samples be sent that far, or is fresh blood required? Could you by microscopical examination determine whether a scar is caused by a cut or a burn? —H. A. T.

Reply by Dr. Eichhorn: Relative to the possibility of establishing the ownership of a steer through blood tests and the dehorning scar, I do not believe that such a procedure would result in definitely establishing the identity of the animal.

With reference to a precipitation test which has been developed for the identification of the species of animals from which the blood originated, this could not be effectively applied in this case, in which it is desired to establish by blood tests whether a certain steer is the offspring of a cow as made by claimant.

While with carefully conducted precipitation tests it is possible to determine the origin of

blood and identify the same as having originated from a definite species, the tests have not proven absolutely reliable even for the identification of individuals in a definite group of species. That is, while it is possible to determine whether a given sample of blood originated from human beings or from a certain species of animals, the test is not entirely dependable for the establishment of the blood sample whether it originated from a dog or wolf or to differentiate by the test between a horse and a mule. Naturally if even the group distinction is impossible, the establishment of family relations through the test is still more doubtful.

I believe there is a case on record where through such tests a mother has claimed a child as being hers, but I doubt whether the forensic value of such a test would hold.

Investigations conducted along these lines are still open to doubt, and most authorities agree that the test is not as yet sufficiently developed to warrant its use for the establishment of the origin of blood of animals belonging to a group.

The Precipitation Test

The precipitation test for the identification of blood samples consists of preparing a precipitated sera in a rabbit through injections with the blood of a certain animal. After a series of injections of the serum of such an animal into the rabbit, the rabbit serum will acquire properties causing a precipitation in the blood serum of the species of animal with which the rabbit has been injected. That is, if a rabbit is repeatedly injected with horse serum, after the third or fourth injection, the rabbit serum will prove to possess precipitating qualities when coming in contact with horse serum. The test is so delicate that the horse serum even in a dilution of 1:10000 when coming in contact with such precipitating sera from rabbits, will show a distinct precipitation. However, if instead of the horse serum, serum of any other animal would be used, no precipitation would develop. This method has also been used for the differentiation of meats in meat products and for this purpose has proven very effective.

As already stated, this test could not be utilized effectively to establish whether a certain steer is the offspring of a certain cow. At least, I would not feel justified in definitely making an assertion of this kind from a blood test.

Identification of Scar Tissue Also Uncertain

With regard to the scar tissues following dehorning, while there are differences in the scar tissues resulting from a burn compared with those resulting from a cut, yet in this instance also I would say it would be difficult to obtain convincing expert testimony. It would resolve itself into the preparation of microscopical sections, and even then distinctions are not sufficient at all times to enable one to make definite claims.

Therefore, it appears it would be very difficult to establish the ownership of the steer through the tests suggested by you, and besides the blood test in itself is such a complicated matter that it would require several weeks at least to prepare several rabbits before serum could be used for testing purposes.

BLOOD TRANSFUSION

In your next issue please give us the technic for making blood transfusion in animals.—A.C.K.

Reply: This was described by Dr. L. A. Merillat in the May 1920 issue of VETERINARY MEDICINE as follows:

"The transfusion of blood from a selected donor has been an established procedure in human medicine for over a century in the treatment of certain conditions requiring a new or additional blood supply. Veterinarians, although constantly in contact with proper indications, have never included the procedure in their category of curative measures, because it has not been found very convenient to transfuse blood from animal to animal on account of their restive habits and the difficulty of vessel anastomosis.

"The blood vessel to blood vessel method in vogue until recent years was in fact hardly suited to veterinary practice under the conditions in which the veterinarian usually found his patients at the time they required such intervention. Today, the Crile method of blood transfusion offers a means by which we can resort to this helpful measure without any of the old obstacles intervening. The plan consists simply of securing the necessary quantity of blood from an available donor, adding an anti-coagulant and then instilling it into the venous side of the circulatory apparatus of the patient.

"The operation can be resorted to wherever the emergency arises, whether in the field, stable or hospital. The technic is very simple. The mixture advised should contain blood, nine parts, and citrate of sodium solution, 2 per cent, one part. By using a large Leur syringe of 100-cc capacity the operation may be accomplished without exposing the blood to any other container. The syringe is first loaded with 10 cc of the citrate solution and inserted into a superficial vein, e. g., the jugular, and drawn full of blood. The syringe is shaken gently to thoroughly mix the blood and citrate solution and without further

ceremony the contents are injected into a vein of the recipient. The procedure is repeated until the amount of blood required has been transferred.

"The operation is indicated in veterinary practice for severe traumatisms, post-operative shock, post-partum hemorrhages, enfeebled heart during operations, hemorrhages in general and anemia from any cause. To what extent this simple measure might be found helpful in pneumonia and other enfeebling diseases remains to be seen. Tests for hemolysis and agglutination are refinements that may be added."

BRAHMAN (ZEBU) CATTLE

There are several types and breeds of Brahman (Zebu) cattle, all of which have their origin in some part of India. Certain areas have adopted a definite type, depending largely on the use made of the cattle—whether for meat, milk, or work.

The larger types have been imported into the United States and they have shown marked adaptability to certain sections of the Southwest and of the Gulf coast region.

Their ability to graze on scant pasture, their resistance to hot weather, diseases, and pests, and their breeding efficiency are characteristics which make them particularly valuable in certain sections of the Gulf coast.

Brahman cattle are commonly called "Brahma" in the United States and "Zebu" in South America and Europe. The committee on terminology of the U. S. Department of Agriculture has adopted the term "Brahman" as the preferred name of the species *Bos indicus*, the humped cattle of India.

A Brahma-Hereford Grade Cow

Resistance to Ticks and Other Parasites

The resistance to ticks by purebred Brahman cattle and of grades containing even a very small percentage of Brahman blood is largely responsible for their continued use and probably their ability to survive since early days in Texas. This peculiar resistance has been attributed to the shortness of the hair, thickness and toughness of the hide, and the waxy secretion from the hide. The opinion regarding thickness of hide seems to be unfounded.

Bull **Cow**

In the opinion of J. D. Mitchell, Victoria, Texas, the waxy secretion (though not of greasy nature or offensive odor) emanating from the hide forms a scum over the hide and extends to the ends of the hairs and is the principal reason for tick resistance. Mr. Mitchell observed resistance to tick

infestation in grades of one sixty-fourth Brahman blood. This factor has been one of great interest to cattlemen on account of heavy losses of cattle that have occurred from Texas fever. Ticky pastures used for Brahman cattle become more or less free of ticks after two or three grazing seasons.

Few animals infested with lice have been found upon examination of Brahman cattle. They also show a noticeable lack of annoyance by mosquitoes and small black flies, so prevalent on the coast range at certain seasons of the year, which cause other cattle often to quit grazing, bunch and begin to wander.—Bulletin No. 1361, U. S. Dept. of Agriculture.

PASSING THE SOUND ON THE BULL

One of the features of the post graduate school program put on by the State College of Washington, January 14th to 17th, was a demonstration by Dean E. E. Wegner of the passage of the sound on bulls.

It has generally been understood among veterinarians that this was impossible because of the double curve of the organs while in the resting stage. It was conclusively proven, however, that this manipulation is entirely practical and very easy. The animal is made fast and the front and hind limbs on each side tied securely together so as to freely expose the abdomen. Since there is no catheter made for this purpose it is necessary to improvise some sort of an instrument. It is found out that the waxed linen catheters, so commonly used in dogs and which would be about the right size for the ox, are not made in this country and it would be impossible to secure one long enough for this purpose unless it were made in Europe.

The authors of this demonstration took a solder wire about four and one-half or five feet long, and heated the end until it was ballooned somewhat and made a kind of an enlarged probe-like end on it. This solder wire so treated makes a very suitable sound for this purpose. It is easily bent and is not hard or irritating. Another substance that makes a good sound and which can be secured in many sizes is the common lead wire used for fuse wire by electric concerns, which can be obtained from them in almost any desired size. This lead wire may also be heated on the end and that portion gently expanded to make a proper probe point.

The organ is protruded from the sheath after the animal is fast and laid on its side. The end of the organ is grasped with a damp cloth and held while the sound is introduced into the urethra. As the organ is slightly protruded from the sheath, it is found that the two curves are entirely straightened out and the sound above referred to, already lubricated, can be easily passed through the urethra up to the ischial arch. It may be possible to introduce it still farther but since the sound did not pass this point easily and it was not desired to injure the urethra in any way, further passage was not insisted upon. If we had suitable waxed linen catheters for this purpose, I am very sure that a further introduction would be possible.

The demonstration proved conclusively that passing the sound in the bull is entirely practical and might be used to good advantage where there is occlusion of this duct by calculi or other kinds of obstruction. We feel that this simple demonstration may be the means of locating foreign substances in the urethra very much easier in the future than they have been in the past, and the idea that this cannot be done is scientifically and practically dispelled.

More recent investigation has shown that it is entirely practical to pass a sound into the bladder of the bull by using a number 20 lead fuse wire, which may be procured from any electrical firm. Then heating and softening the ends to make a ball-shaped or probe-shaped point that will not injure the wall of the urethra. When this is properly lubricated, it is very easy to pass the sound entirely into the bladder as may be evidenced by the small amount of urine that flows when the bladder is reached.

ANOTHER THEORY OF MILK FEVER

Noting Dr. Melhuish's theory of the cause of milk fever, I thought I would make a guess. I have been experimenting with this sickness of bossy since 1880, and the history of my cases are: parturition normal; no milking of subjects before delivery nor complete stripping for two or three days after; cow in fine condition; going down after delivery in from 12 to 72 hours.

Now, for a guess at the cause. A rapid contraction of the uterus with absorption of the lochia, or perchance Dr. Brinkley's hormones. This absorption produces the same effect as alcohol does on man, burns the oxygen of the blood. An abundance of oxygen put in the udder puts bossy on her feet with the demonstration of a specific. As Harry Lauder says, "Ye canna beat it."

Union Grove, Wis. T. F. Moyle.

DEODORIZING A RETAINED PLACENTA

If you enjoy removing a placenta from the cow, don't try this method, for if you do, it will spoil your enjoyment. Get a waxed paper bag, in size called ¼. Fill it with powdered charcoal, tie the bag and place one in each horn of this dilemma. Then, listen for your client to tell you the next time called, "Doc, that last cow you cleaned never stunk a bit."

T. F. M.

DEFICIENCY DISEASE IN PIGS

The accompanying illustration is from a photograph presented by Dr. A. J. Peterson of Lindsborg, Kansas. The doctor gave the following history and description of the condition:

"An investigation was made to ascertain the cause of extensive swellings in the throat region of three 150-pound shotes. There were about 25 head in the lot and according to the owner they had been thrifty and doing fine until about two weeks prior to my visit, when one of the shotes showed an extensive swelling in the throat region and was destroyed. Three more cases occurred soon after the one pig was destroyed and the accompanying photograph is of one of these. The principal symptoms were swellings in the throat region which the owner stated subsided but would recur, muscular trembling and unsteady gait. One affected severely was destroyed and autopsied. The swelling was found to be due to enlarged thyroids, and there was also an apparent enlargement of the parotid and submaxillary salivary glands. The thyroid gland was pale in color and slightly edematous. The subcutaneous tissue in the throat region was edematous. The thymus gland may have been slightly enlarged. No other lesions were found. Blood samples were submitted to a laboratory for an examination with negative findings.

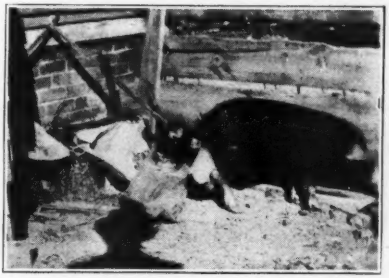
"A provisional diagnosis was made of dietary disorder, probably due to deficiency in iodin. Calcidin was prescribed for the affected pigs to be given in the food, but no results were obtained, probably because the pigs would not consume the medicated feed.

"The two affected pigs died about six weeks after the onset and no further cases have occurred.

"Deficiency diseases are relatively rare in this locality. An occasional case of rickets has been observed, but there has not been a single case of hairlessness in pigs or goitre in young animals of any species observed or reported in this community."—A. T. Kinsley.

CAN SWINE CASTRATION BE IMPROVED?

The unsexing or castration of animals is an ancient practice. Castration in swine is done for economic reasons, the meat of a boar or a stag having a disagreeable odor and in some instances is not palatable. This operation has usually been done by the breeder and the losses have been relatively small. Whether or not the age for castration excepting mature boars has any influence upon the flavor and keeping quality of the meat and the development of the unsexed animal is still an open question. Should pigs be castrated within ten days after farrowing, or should they be castrated at some other time? No doubt, there are other factors that have influenced the time of castration, such as climatic conditions and the general sanitary conditions of the surroundings. Will the method of castration have any influence on the character of the meat and the development of the pig? What are the advantages of the covered operation? Will better results be obtained if castration is done by ligating the spermatic cord without removal of the testicle? Will the gradually atrophying testicle have any influence upon other functions of



Sequel of faulty castration. The cord was enlarged and grown to sac. After removal it weighed 11½ lbs.; the pig weighed 41 lbs. Reported by Dr. W. C. Caldwell, Laurinburg, N. C.

the body? Can ligation castration be done economically?

Also, what about the possibility of destruction of the testicles by the injection of testicular substance into the animal to be castrated? Is this mode of castration practical?

Shall the veterinary profession be content without more definite information on the castration of pigs, and other animals? Much information of this minor operation and the influence resulting therefrom can be obtained by careful observations and recording the facts. Is it not worth while to ascertain more definite information of an operation that involves 25 to 30 million swine each year? If investigational efforts resulted in an improved method of castration that would net the producer 5c per head it would mean the saving of one and one-half million dollars annually to the swine industry of the United States.

A. T. K.

IMMUNIZING YOUNG PIGS

I notice in the December issue the question, "If a sow is immunized against cholera a few days before farrowing, are the pigs liable to take cholera from nursing?" and the answer is "No."

I wish to state that if the mother is not immunized at least two weeks before farrowing and you want to save the pigs, you had better give them some serum when they arrive. Immunize the sow a week or ten days before she farrows and see what becomes of the pigs unless you give them serum.—C. E. C.

Reply by A. T. K.: I am pleased that you called attention to this fact, but it has been fully realized that to give a comprehensive answer to any inquiry would require extensive explanation and therefore occupy too much space in the journal. So far as the statement in the journal is concerned, the contrary has never been proved; at least, I do not know where the proof has been recorded.

It is true that pigs from sows immunized while pregnant or even from immune sows may develop cholera while they are suckling, but that does not prove that the infection is transmitted through the milk. There are many cases on record in which pregnant sows have been hyperimmunized and farrowed apparently healthy pigs.

If the virus of cholera passes to the fetus in utero, it is reasonable to assume that the antibodies of the serum may pass through like channels and the pig in utero would be simultaneously immunized with its mother. Such immunity would probably be of short duration.

Another factor in this problem that should not be overlooked is the fact that in hundreds of instances one or more pigs in a lot cannot be found or caught and are not immunized when the rest of the herd have been so treated. Unless cholera is introduced on the farm from some other source, the immunized pigs, although they have received virus, will not transmit the disease to those not immunized. This is a further point in the consideration of transmission of cholera from a recently immunized sow to a suckling pig.

A HOG CHOLERA BREAK

I have recently investigated a herd of swine in which there have been some losses, and will appreciate any information relative to the cause, treatment and prevention of a similar occurrence.

On October 6th, all swine in the herd in question, consisting of 16 brood sows, 88 suckling pigs, two boars, and 74 shotes, were treated with anti-hog cholera serum and virus. The herd was healthy at the time of treatment. The weight of the brood sows and boars was estimated at from 200 to 250 pounds, the shotes at 130 pounds, and the suckling pigs at 25 pounds, at the time of treatment. The dosage of serum used was 80 to 100 mils for the sows and boars, 50 mils for the shotes, and 25 mils for the suckling pigs; and dosage of virus used was 3 mils for the sows and boars, 2 mils for the shotes, and ½ mil for the suckling pigs. The general surroundings were better than is usually found on farms, and the owner fed a restricted slop diet for a ten-day period.

The swine made the usual gain and were apparently healthy until December 5th, when several of the pigs that were suckling when treated, although they had been weaned about the 15th of November, were noticeably sick.

A careful investigation was made on December 6th, and the sows, boars, and shotes were found to be thrifty and apparently healthy, but several of the recently weaned pigs were gaunt, knuckled over, thumping, refused to eat and had temperatures ranging from 105 to 108. Two of them were destroyed and evidenced tumefied hemorrhagic lymph glands, numerous petechial hemorrhages beneath the visceral pleura; the spleen was slightly enlarged, the kidneys contained petechial hemorrhages, and there were hemorrhages in the mucosa of the epiglottis and bladder.

The foregoing symptoms and lesions were sufficient to make a provisional diagnosis of cholera. The herd was retreated.

If this was cholera, why did it occur in the one group of pigs, for in the original treatment

serum and virus of the same series was used in the entire herd?—F. C. B.

Answer by A. T. Kinsley: Your letter of inquiry received. You have given a splendid detailed report of hog cholera due to an apparent virus break. As you know, there has been some controversy on the possibility of permanently immunizing suckling pigs. It is true that several reports have been made of the immunization of suckling pigs in which the immunity was sufficient for protection, but several practitioners have reported breaks 40 to 60 days after the simultaneous treatment of suckling pigs.

It is noted that you gave the suckling pigs only ½ mil of virus, which dosage is insufficient and was probably the principal factor in this break. Generally speaking, it is not advisable to attempt to produce a permanent immunity in suckling pigs, but if it is necessary to treat the suckling pig with serum and virus the dose of virus should not be less than 2 mils, and it would be better to use up to 5 mils.

Assuring you VETERINARY MEDICINE is always glad to be of service to the veterinarian.

ANTEPARTUM PARALYSIS OF EWES

During January, February and March of each year, there appears a rather unusual and highly fatal malady of sheep, the exact pathology of which is unknown. The disease has been described under various names by Gilruth of Australia, Kinsley, Luckey, Hadley and others, and is known to occur in practically all parts of the world where sheep are raised.

This condition is peculiar to ewes which are far advanced in pregnancy, and are being highly fed, also it is more common in those ewes closely confined and not permitted abundant exercise. It rarely occurs in ewes being fed succulent feeds, such as, ensilage and roots, or in those run on winter pasture.

The symptoms of this disease are quite characteristic. At the onset the animal appears to be nervous, as manifested by twitching of the ears, easy excitability, and jerkiness of movement. As the disease progresses vision becomes impaired, and blindness often results. The nervous manifestations become more pronounced until the animal loses its equilibrium and goes down. At this stage the head is generally drawn back as in meningitis. When the ewe first goes down spasms of short duration occur, after which the animal remains quiet and apparently comfortable until disturbed, when there is apt to be recurrence of spasms. Finally the animal completely loses consciousness, becomes paralyzed and dies. The course of the disease varies from three to seven days. During this time there is practically no elevation of temperature.

On postmortem examination no constant pathologic changes are found, although when the animal has lingered for six or seven days hemorrhagic septicemia may be found to exist as a secondary condition.

The cause of this disease is not known beyond the fact that it is associated with the liberal feeding of a poorly balanced ration. In every flock investigated by the author the amount of protein contained in the feed has been too great and the general symptoms of the disease point to a protein poisoning.

Treatment of affected animals is of little avail except in the very early stages, when a brisk purgative is indicated and gives fairly satisfactory results.

In handling a flock found to be affected the most satisfactory procedure is to administer a laxative to all ewes in the flock, and to change the feed in such a manner that a well balanced ration will be fed. The feed should not contain a high proportion of legumes or other nitrogenous substances, and should contain some succulent feed as ensilage or winter pasture. When this method is followed, losses usually cease to occur in from four to seven days.

Kansas City, Mo. Ashe Lockhart.

PARALYSIS OF PENIS IN A HORSE

I should like to ask your opinion in regard to a case of paralysis of the penis in a horse, which from all appearances must have existed since about two weeks ago when we had weather below zero. It looks very much as if the penis had frozen. The animal is able to urinate and seems to feel all right; otherwise, the penis and sheath are badly swollen and a serum-like exudate is dripping from the parts. —G. F. E., Illinois.

Reply: One strongly suspects that an operation will be the treatment required. However, this should not be performed until all local swelling has subsided, or until it has subsided as much as it is possible to induce it to subside by the use of local treatment, massage and manipulation. If the condition lasts for thirty days without material improvement, then amputation would be indicated.—Editor.

TREATMENT OF LAMINITIS

On November 4th I was called to treat a nine-year-old mare, weight 1600 pounds, suffering apparently from an acute attack of laminitis, also tendinitis. Temperature 103° F; pulse full, hard and bounding; loss of appetite. On being moved she would place her hind feet well under the body and pick up the front feet gingerly, typical of acute laminitis.

I gave a physic ball, also 15 minims of fluid extract of aconite; bandaged the legs from the knees including feet with cotton and bandages and had cold water applied every thirty minutes. Then I put the mare on the following:

F. E. aconite	dr. ii
Belladonna	dr. i/iv
F. E. colchicum	oz. i/iss
Potass. nitrate	oz. i/iv
Aq. qs.	oz. xxx-i/iv

Sig. 2 ounces in 6 of water every 3 hours.

The mare apparently did well for three days, when the temperature was normal. Then I blistered the tendons and coronets and put the patient on potassium iodid, two-dram doses twice daily in drink. After the mare had taken the eleventh dose of potassium iodid, the owner noticed her lie down. He urged her to get up, which she did, but seemed stiff and sore all over. In a few minutes she dropped to the floor as if she was shot and had a spasm.

I was called and found the mare lying on her sternum, front feet partially extended. About every three to five minutes a spasm would come on. She would put her nose to the floor and tuck it right back to her breast. She breathed heavily, rolled from side to side and kicked slightly with her hind legs. The muscles of the neck were distended, hard and rigid. The eyeballs turned down in the orbit until one could see half of the upper white of the eye. These spasms would last from 15 to 25 seconds. She came out of them suddenly and appeared perfectly normal for three to five minutes, when another attack would come on. There were no symptoms of iodism, such as flow of tears, discharge from nostrils or hair standing up.

I gave 1/10 grain lobelin sulphate. There was no change in thirty minutes. Thinking probably the spasms were due to some digestive disturbance, I then gave one grain eserin, 2½ grains pilocarpin hydrochlorid and ¼ grain strychnin subcutaneously in two doses fifteen minutes apart.

After receiving the latter, the mare had another spasm and passed quite a lot of gas. In one hour she got up and within the next thirty minutes had four small bowel movements. But upon rising to her feet, she was about as stiff and sore fore and aft as any horse I had ever seen. She came out of that quite a lot before the end of thirty minutes. I gave her a physic ball and left. The next morning the owner reported the mare still standing but didn't care to drink or eat, although not very sore or stiff.

What I want to know is, was I right in thinking the spasms were due to some digestive disturbance? The owner told me the feces passed during the night were quite dry and hard. If I am not right in my diagnosis, what was the cause? —A. C. K.

Reply by Dr. Merillat: I think you have "over-doctored" your founder case. In the first place, it was a mistake to blister the leg and foot of a case of acute. liminitis of three days duration; in the second place, you will have much better luck with this trouble if you do not administer an aloetic ball; and finally iodid of potassium is not necessary, and probably harmful. A horse affected with a serious intestinal irritation, given a dose of aloes, a blister on both legs and approximately three ounces of potassium iodid during the acute period, has every reason to have convulsions.

We treat laminitis with small repeated doses of oil, aconite, cold swabs and some forced exercise every day, two or three times, and encourage lying down. There is no need of any other treatment. Blistering a chronic case may be defended, although I have yet to see any benefit therefrom. You tried to do too much for your patient in the medical way.

FORAGE POISONING IN A COLT

Last night I was called to see a filly, rising two years of age, and her symptoms to me were so uncommon that I gave a guarded diagnosis, as well as prognosis, and should very much like your opinion on the case.

History: Colt had been running out during the day and in at night with a number of other young horses, and the owner claimed that as far as he knew everything was O K on the morning of the day I was called to see the animal; about 4 P. M. when driving them from the stock this particular colt was behind the rest and to use the owner's words, "seemed to have lost power of the hind end, also head was held too high and a little to the right."

On my arrival, the beast was standing quiet but seemed to be resting the right hind leg, and when made to move seemed to have very little power of the right hind, as well as the right fore leg, but would shortly stand on them fairly well

and bear a fair percentage of its weight so long as it was not made to move.

Temperature and pulse normal; appetite good; bowels normal.

The other peculiar symptom was a sweating of exactly the right half of the body; half the face, the right ear, right leg, etc., were all quite damp with perspiration while the left side was perfectly normal. The nose was not pulled to one side as in facial paralysis; sensory nerves were also working normally on both sides.

The animal stood in front of a small window which opened into an outer shed but still there was a slight draft. No injury to the head nor any other part of the body could be detected.

Any light you can give me on the above case will be thankfully received and should you feel like noting it in your valuable journal, you are at liberty to do so.—H. R.

Reply by Editor: I cannot see anything in this but rather a mild attack of what veterinarians commonly call forage poisoning. I mean a digestive nervous ailment resulting frequently from the ingestion of moldy corn or moldy straw or frozen silage, and less frequently from moldy oats or moldy hay; and sometimes, without any cause that is discoverable so far as the quality of the feed is concerned.

That the poisoning, if we may term it such, was not severe, is evidenced by the rather mild though perfectly typical symptoms displayed and by the further fact that the colt was attacked first, colts being very considerably more susceptible to this type of the disease—in the South called "stomach staggers"—than older animals.

BIRDS AS CARRIERS OF FOOT AND MOUTH DISEASE

During the last 22 years there have been 80 initial outbreaks of foot-and-mouth disease in Great Britain. By initial outbreaks are meant those which must be ascribed to the introduction of the virus from the Continent, as distinct from the extension of the disease in this country. No satisfactory explanation of the manner in which the virus is introduced has so far been found. Statistics show, however, that a curve plotted from the numbers of initial outbreaks a year corresponds closely to the curve of the incidence of the disease in Western Europe—that is to say, when the disease is most prevalent on the Continent the number of outbreaks in Great Britain is highest. In the great majority of cases these initial outbreaks furnish no history of contact with persons recently returned from the Continent, or of the importations of foodstuffs, etc. Sir Stewart Stockman has several times examined the possibilities, and in 1919 suggested that the virus might be airborne. In the Journal of the ministry of agriculture for November last he has discussed the further possibility that the virus might be carried by birds. In this article he has pointed out that certain features in connection with the time and place of initial outbreaks may be correlated with some normal features of bird migration.—Veterinary Record.

COMPOSITION OF BOWMAN ABORTION REMEDY

Do you know if any analysis of the Bowman Abortion Remedy, marketed by the Erick Bowman Remedy Co., Owattonna, Minn., has been made? If so, what does it contain?—G. P. S.

Reply: An analysis of this preparation recently made by chemists at one of the experiment stations shows that the "remedy" is composed of brown sugar and bran.

IODIN AS AN ABORTIFACIENT

I noticed this item in the journal: "To produce abortion in a bitch, inject tincture of iodin into the uterus." What is the technic.—A. K.

Reply by Dr. Merillat: The iodin method of aborting a bitch is practiced by Dr. F. R. Whipple, Peoria, Illinois, a very capable canine specialist. He uses a common syringe with a long slender nozzle. The nozzle is passed into the uterus carefully and ten to twenty drops of pure tincture of iodin is injected. If done within a few days after conception, the discharge of the embryo will not be noticed as it is too small. Later however the miscarriage is visible.

BANDAGING HORSES

The value of bandaging has been little appreciated in our service on account of the general lack of knowledge concerning it and the consequent lack of practice of it. It has, however, very valuable uses for us as well as for the civilian horse world; namely, to support tendons, tendon sheaths and blood vessels; to maintain warmth; to control hemorrhage, and to protect the limbs from injury. They are classed generally as work and rest bandages and are usually made of elastic cotton or wool. The elastic cotton is best for work and the wool for rest. Both work and rest bandages are wrapped from knee to fetlock. Rest bandages should be seven or eight feet long and put on without interfering with the circu-

lation, viz., snugly but not tightly. Work bandages may be slightly shorter, but are wrapped more tightly so as to afford the necessary support and so that they will stay on. They should never be allowed to remain on in the stable. On returning from hard work, the work bandage is removed, the legs hard rubbed and then rest bandages put on. Woolen work bandages should never be used when they are liable to become wet. The shrinkage would be apt to injure the legs.

C. E. Jewel,
Lieut. Col., V. C. (Retired).

Organization and Functions of the Veterinary Service in Peace

By Capt. Geo. H. Koon

The National Defense Act creates an Army of the United States consisting of three components; the Regular Army, the National Guard, and the Organized Reserves. The law provides that, except for training purposes, the organized reserves cannot be called into service except in case of a national emergency, declared by Congress. This means that the reserves are a war-time organization and should be trained in the arts of war and to function in the field.

The line of demarcation between peace and war-time veterinary service cannot be so sharply drawn as to permit of a successfully functioning personnel in war that does not have a good understanding of the basic principles of the service in peace. Before attempting, therefore, to outline the veterinary service in campaign—its organization, personnel and equipment, functions, training, etc.—a description of the service in peace will be given, to be followed with a description of the service of the interior and of the theater of operations in war.

Changes Following the Recent War

Following the World War every branch of the army commenced the revision of army regulations governing their particular service, writing into those regulations requirements based upon the lessons learned in the war. New regulations have been written governing the veterinary service, using Special Regulations No. 70 and the Manual for the Medical Department as a basis, paralleling regulations governing the medical service so far as possible, and giving us, beyond any doubt, the most complete regulations governing the army veterinary service of any country.

A comprehensive understanding of the peace time veterinary service can be gained through the army correspondence course previously described. If every veterinary reserve officer would pursue that course of instruction this particular phase of these articles would not be necessary. However, it is not believed every reservist will avail himself of the opportunity to take this correspondence course, and there are many readers of VETERINARY MEDICINE who do not hold commission in the reserve and who may not become commissioned, but in case of a national emergency they would enter the service. Therefore, if they read these articles they will gain some idea of the army veterinary service.

Published Regulations

The army veterinary service is defined in Army Regulations 40-2005 to 40-2270. The prefix number "40" is the one alloted to Medical Department regulations. All regulations are written in pamphlet form, and those governing the veterinary service are numbered in sequences of fives. One number in this sequence, "40-2040," is vacant. Three other pamphlets have not been published: namely, 40-2020, 40-2120, and 40-2235. The numbers and titles of the pamphlet regulations governing the veterinary service follow:

40-2005	Veterinary Service, General Provisions.
40-2010	Duties and Titles of Veterinary Officers.
40-2015	Department and Corps Area Veterinarians.
40-2025	Attending Veterinarians.
40-2030	Employment and Compensation of Civilian Veterinarians.
40-2045	Veterinary Service, Remount Purchasing and Breeding Headquarters.
40-2050	Veterinary Service, Remount Purchasing Boards.
40-2055	Veterinary Service, Ports of Embarkation and Debarkation.
40-2060	Veterinary Service, Animal Transports.
40-2065	Veterinary Hospitals.
40-2070	Veterinary Hospital Rules.
40-2075	Physical Examinations of Animals.
40-2080	Veterinary Sanitation.
40-2085	Veterinary Forage Inspection.
40-2090	Communicable Diseases of Animals, General.
40-2095	Communicable Diseases of Animals, Disinfection.

40-2100 Communicable Diseases of Animals, Glanders.
40-2105 The Ophthalmic Mallein Test of Animals.
40-2110 The Intradermic Mallein Test of Animals.
40-2115 Communicable Diseases of Animals, "Shipping Fever."
40-2125 Communicable Diseases of Animals, Mange.
40-2130 Communicable Diseases of Animals, Surra.
40-2135 Communicable Diseases of Animals, Dermatitis Gangrenosa.
40-2140 Veterinary Laboratory Service.
40-2145 Material for Veterinary Laboratory Examination.
40-2150 Veterinary Meat and Dairy Hygiene, General.
40-2155 Veterinary Ante-Mortem Inspections.
40-2160 Veterinary Post-Mortem Inspections, General.
40-2165 Veterinary Post-Mortem Inspections, Cattle and Calves.
40-2170 Veterinary Post-Mortem Inspections, Sheep and Goats.
40-2175 Veterinary Post-Mortem Inspections, Swine.
40-2180 Veterinary Products Inspections, General.
40-2185 Veterinary Products Inspections, Fresh Products.
40-2190 Veterinary Products Inspections, Eggs, and Sea Foods.
40-2195 Veterinary Products Inspections, Cured Products.
40-2200 Veterinary Products Inspections, Canned Products.
40-2205 Veterinary Products Inspections, Sausages, etc.
40-2210 Veterinary Products Inspections, Lards and Oleomargarin.
40-2215 Veterinary Products Inspections, Butter.
40-2220 Veterinary Products Inspections, Cheese.
40-2225 Veterinary Inspections of Establishments.
40-2230 Veterinary Dairy Inspections.
40-2240 Veterinary Statistical Reports.
40-2245 Register and Report of Sick and Wounded Animals.
40-2250 Veterinary Diagnostic Nomenclature.
40-2255 Veterinary Sanitary Reports.
40-2260 Veterinary Meat and Dairy Hygiene Record and Report.
40-2265 Physical Examination of Animals, Record and Report.
40-2270 Veterinary Health Certificate and Memorandum.

The object of enumerating the different pamphlet regulations governing the veterinary service is to show the comprehensive manner in which the subject is handled, and incidentally to give some idea of the scope of that service.

Duties of the Veterinary Service

Without further preliminaries an epitomized description of the veterinary service will be given, the material for the most part being taken from the regulations.

The veterinary service as a part of the medical department is charged in peace and war with duties falling under two definite heads: First, those in connection with the animals of the army; second, those concerned with the food supplies of troops that are of animal origin.

Care of Army Animals

As regards animals, the veterinary service is responsible for investigating the hygiene and the sanitary condition of the animals of the army and making recommendations with reference thereto; advising as to methods of animal management in so far as they concern animal health and efficiency; instructing military personnel in military animal sanitation and management and horseshoeing; the examination of forage when procured, in storage and at issue; the evacuation and care of sick and wounded animals; the physical examination of animals; the management and control of veterinary military hospitals and all other veterinary units; and the control, training, instruction, and assignment to duty of the commissioned and enlisted personnel of the medical department assigned to veterinary service.

The objects of this phase of the veterinary service are to protect the health and preserve the physical efficiency of the animals of the army. These objects are to be attained by:

(1) The application of the principles of veterinary sanitary science to maintain animals in a correct environment as regards their shelter, restraint, handling, feeds and feeding, grooming, work and exercise, shoeing, clothing and equipment with a view to eliminating so far as practicable the causes of physical inefficiency.
(2) The initiation of suitable protective measures to prevent the introduction of communicable diseases, and the prompt detection and proper handling of such cases, including the adoption of the necessary suppressive measures to limit their duration or extension.
(3) The reduction of animal losses and inefficiency by the prompt discovery of the sick and wounded, their separation from the well, their evacuation, their segregation in veterinary hospitals, and the application of curative measures.
(4) The physical examination of animals

prior to purchase and at other times with a view to insuring the acquisition of only sound animals and the prompt and economical disposal of the unsound.

Inspection of Food Supplies

As regards food supplies, the veterinary service is responsible for investigating the soundness of quality and sanitary condition of meats and meat food and dairy products prior to and at time of purchase, while in storage and at issue; the sanitary condition of establishments, storehouses, freezers, refrigerators, refrigerating space in cars and ships and other places in which such supplies are manufactured, handled, stored, shipped, or issued; the sanitary condition of dairies and milk herds supplying troops; and for making recommendations with reference thereto, and with the instruction of veterinary personnel in the performance of the foregoing duties. The necessary information is obtained through the operation of the veterinary inspection procedures prescribed in appropriate pamphlets, Army Regulations.

Relation to the Medical Department

The dual nature of the functions of the veterinary service, concerning animals on one hand and human beings on the other, involves a close and definite relationship in the general service required of the medical department. The veterinary service with animals and the medical service with humans proceed along parallel lines. The problems of sanitation and preventive medicine, of the control of preventable diseases, of the professional care of the sick, and the administration of hospitals are precisely analogous, as are the procedures prescribed and the means provided for their solution. While appropriately united in one department and administered under one head —the Surgeon General—the veterinary and medical services above described are, in a technical sense, separate except as they may occasionally meet on the common ground of an animal disease which might possibly be communicable to man. The veterinary service with humans, i.e., that phase concerned with the examination of food supplies, is entirely a matter of sanitation and is a direct extension of the sanitary service of the medical department, which is charged with responsibility in all matters concerning the protection of the health of the troops.

Command and Administration

The veterinary service of a department, corps area, post, camp, or other station, or of an army, corps, division, or other unit, as defined in the foregoing paragraphs, is conducted by the senior veterinary officer on duty, whose official designation is the veterinarian. The veterinary service, as a part of the medical department activities of the command, is supervised by the surgeon and in his staff relations the veterinarian is the assistant of the surgeon, who in turn is the representative of the medical department on the staff of the commander concerned.

At all military stations and in the field the veterinarian commands and administers the veterinary detachment, veterinary hospital, or other veterinary unit, and exercises those functions separate and apart from the administration of the Medical Department units employed on medical service.

In the absence of a veterinary officer, the surgeon is directly responsible for the veterinary service, including its administration; provided that competent veterinary assistants, enlisted or civilian, have been assigned him.

The veterinary service of the army is administered, under the direction of the Surgeon General, by an officer of the medical department, who shall be elected by the Surgeon General and assigned to duty in his office as Chief of the Veterinary Division.

It is not the function of the editor of this section of VETERINARY MEDICINE to discuss, amplify or in any way attempt to explain reasons for the above paragraphs being written into army regulations. Suffice it to say that those having a knowledge of the veterinary service in all its phases, and of the place alloted to the service in the general scheme of the army, know that all independence of action that it will be wise for veterinary officers to possess for some time to come has been written into the regulations.

Veterinary officers on duty will attend all public animals and the authorized private mounts of officers; also, when practicable, other animals and pets actually owned and kept by officers, enlisted men, company messes, post exchanges, and like organizations, and, at stations or in the field, where other veterinary attendance can not be procured, civilian-owned animals employed or maintained on the reservation.

Veterinary Officers May Do Private Practice

If citizens in the neighborhood of a military post or the residence of an army veterinary officer desire the professional services of such officer, and the attendance of a private practitioner can not conveniently be had, it is re-

garded as not inconsistent with the regulations governing the army for such officer to render his services when this does not interfere with the proper performance of his official duties. But the establishment of an office for the purpose of engaging in civil practice is prohibited.

Private or civil practice by army veterinary officers in civilian communities, the needs of which can be met by civilian practitioners, will be restricted to consultation practice with such civilian practitioners, and to emergency veterinary medical or surgical work necessary to save life or limb or prevent great suffering for which civilian practitioners are not immediately available.

Other Duties Besides Veterinary Practice

In addition to the duties and responsibilities devolving upon him as a practitioner of veterinary medicine, the veterinary officer has certain other duties and responsibilities by virtue of his commission as an officer of the army. These duties and responsibilities may be classified in two groups, namely, advisory and administrative. The former embraces duties analogous to those of the staff officer to his commander; the latter, the duties of an organization or detachment commander to his superiors and to the organization or detachment which he commands. For example, the duties of a veterinary officer inspecting food supplies are advisory; those of the commanding officer of a veterinary company are administrative; while the duties of station veterinarians are both advisory and administrative.

Advisory Duties

The duties of a veterinary officer acting in an advisory capacity are, in general, as follows:

(1) To keep himself informed of existing conditions and, especially in the case of a moving command, of conditions which may be anticipated, which have a bearing upon the health and physical efficiency of the animals of the command or as regards prescribed food supplies and dairy herds supplying troops, of conditions which have a bearing upon the health and physical efficiency of the troops.

(2) To communicate to his superiors such of this information as has a bearing upon military administration and to recommend such measures as the veterinary officer may deem advisable to meet the existing or anticipated conditions. The scope of the information required, and of the field which recommendations must cover, varies greatly.

(3) To communicate promptly to the surgeon such of this information as has any bearing upon the health of the troops.

(4) To make prescribed reports and returns and to take such action on the reports and returns of his subordinates as may be required by existing regulations.

(5) To perform such other duties as may be required of him by superior authority.

While veterinary officers acting as technical advisers to their superiors are responsible for pointing out unsanitary conditions in connection with the animals of the army and making proper recommendations for their correction, the direct responsibility rests with the commander. If, however, the commander authorizes the veterinary officer to give orders in his name for the correction of defects, then the duties and responsibilities of the latter are correspondingly increased.

Veterinary officers must always remember that when any veterinary necessity of the moment comes in conflict with a purely military necessity the former must be considered as of secondary importance, unless they are convinced that the authority responsible for the military necessity is not aware of the far reaching results from a veterinary point of view, in which case they may represent the matter to the military authority concerned, who alone is in possession of all the facts and who alone can decide.

Administrative Duties

Veterinary officers acting in an administrative capacity are directly responsible for the condition and efficiency of their commands. Their duties are similar in character to those of administrative officers of the line of the army. More specifically they are charged with the following:

(1) The training, discipline, efficiency, and assignment to duty of the personnel which they command and the supervision of the internal economy of their organizations.

(2) The maintenance of equipment in proper condition by requisition for supplies needed and by proper care of property on hand.

(3) The keeping of the prescribed records and the making of the prescribed reports and returns.

(4) The performance of such other duties as may be required of them by superior authority.

(To be continued.)

The many friends of Major Geo. A. Lytle, V.C., who was in charge of the army meat

inspection activities at Chicago for years, and instructed many emergency veterinary officers in this activity during the World War, will regret to learn of his very critical illness at Walter Reed General Hospital, Washington, D. C.

CHANGES IN VETERINARY RESERVE SECTION

This month's report of changes in the Veterinary Reserve Section shows a loss of 33 reservists whose period of appointment has ended. Seven of this number declined reappointment, while the other 26 neither declined nor accepted reappointment—they took no action whatever.

The period of appointment is for five years, at the end of which each reserve officer is automatically offered reappointment in the same grade. About two months previous to the time his period of appointment ends the attention of each reserve officer is called to the fact, and he is advised that he will be offered reappointment. Those who decline such reappointment are of course dropped from the lists of reserves, and the names of those who neither decline nor accept are likewise dropped from the lists after a certain period of time has elapsed. Such action must be taken; otherwise, the records, carrying thousands of names, would be hopelessly confused. This is a small matter to the individual, and each one should promptly accept or decline reappointment. Naturally, it is hoped each one will accept.

The automatic reappointment is in the same grade. Under the promotion policy a man serving five years in one grade is entitled to promotion to the next higher grade, but it is up to each man to apply for such promotion. Upon receipt of advance notice that his period of appointment is nearly over, if each man will apply to his Corps Area Headquarters for promotion, arrangements will be made for a physical examination and his reappointment will be in an advanced grade, provided the papers have been acted upon by the board. The candidate for promotion is examined physically only (except in the case of Lieutenant Colonel), but the papers have to be acted upon by a board and the application approved as a basis upon which the authorities issuing the new commission may act. This matter of promotion must be initiated by the reservists themselves.

It is hoped as the period of appointment expires for those in the veterinary reserve section that they will apply for promotion and accept reappointment.

Changes Relative to Veterinary Officers Regular Army

Captain Jos. N. Hornbaker transferred from Fort Bliss, Texas, to Fort Huachuca, Arizona, arriving at new station February 1, 1924. The 10th Cavalry is stationed at Fort Huachuca.

Additional Reserve Officers

Lieutenant Colonel

Sisson, Septimus, Ohio State University, Columbus, Ohio.

Major

Lunn, Frank P., Payne, Ohio.
Dunn, Ralph A., Fredericksburg, Va.
Embree, Warren J., Chicago, Ill.

Captain

Alford, Simon W., Lincoln, Nebr.
Bedwell, George E., Fletcher, Okla.
Carter, Emert S., Springfield, Mo.
Hunt, John C., London, Ohio.
Maddocks, Levi E., Augusta, Maine.
Morton, Roy M., Churdan, Iowa.
Rundle, Thomas T., Camarillo, Calif.
Runnells, Russell A., East Lansing, Mich.
Schneider, Rudolph H., Boston, Mass.
Thompson, Henry R., Kansas City, Mo.
Webb, Wilton W., Opelika, Kans.

1st Lieutenant

Andress, William W., Philadelphia, Pa.
Butler, Homer C., Madelia, Minn.
Dailey, Hugh F., Brookline, Mass.
Fish, Lynuel O., Norman Station, Ind.
Morgan, James W., Chicago, Ill.
Schaff, Guido J., Kansas City, Mo.
Stokes, Sidney W., Chicago, Ill.
Vornheder, Albert W., New Orleans, La.
Woodring, Fulton R., Lincoln, Nebr.

2nd Lieutenant

Baker, Bruce, Meeker, Colo.
Christy, Constantine M., Brookville, Pa.
Colton, Cyril H., Baker, Oregon.
Conlin, William J., Sioux Falls, S. D.
Currie, Arthur J., Greenwood, Wis.
Galbraith, Alister R., Garfield, Wash.
Griffith, Roscoe C., Independence, Mo.
Harkin, James W., Shullsburg, Wis.
Hedin, Harry, Crookston, Minn.
Jackson, Gilbert T., New Orleans, La.
Kline, George J., Omaha, Nebr.
Levinson, Louis, Middletown, Del.
Merriman, Arthur K., Sullivan, Ill.
Murray, Bruce W., Bruce, Ga.
Neary, Walter E., Boise, Idaho.
Pottle, Leslie G., Quincy, Ill.
Robinson, Ray S., Madison, S. D.
Ryan, Charles L., Dexter, Maine.
Talbot, Perry L., Osceola, Iowa.
Waite, Harrison N., Corsica, S. D.